The Garden Journal

of The New York Botanical Garden

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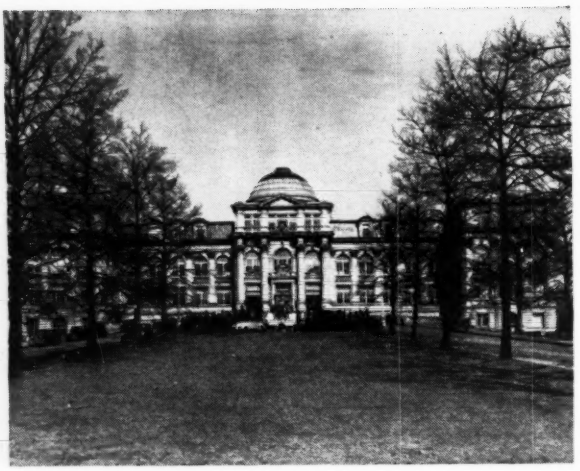

Exhibition, "Cotton From Fable to Fashion," continues in the Museum Building until November 15.

The Ninth Annual Chrysanthemum Show, in cooperation with the Westchester, Long Island, and Northern New Jersey Chapters of the National Chrysanthemum Society, will take place at The New York Botanical Garden on October 23, 24 and 25.

DOROTHY EBEL HANSELL
Editor

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of The New York Botanical Garden

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AMONG OUR CONTRIBUTORS

HELEN M. (MRS. MORTIMER J.) FOX, member of the Advisory Council of The New York Botanical Garden, lecturer and author, visited Israel this spring. Her observations on the agricultural and conservation programs in that land and the plants she saw there make interesting reading. Macmillan published her new book, THE YEARS IN MY HERB GARDEN, this spring. . . . FRANCIS P. TIKALSKY grows and writes about his favorite flower, the peony. He is actively interested in the affairs of the American Peony Society and contributes to its Bulletin. . . . BERT (MRS. JOHN P.) HOBART puts enthusiasm and energy into her garden and into projects for her garden club. . . . T. H. EVERETT is Horticulturist of The New York Botanical Garden. . . . CLARE W. REGAN is happiest when she is striving to find the right conditions in her garden in the mountains of Montana for rare and unusual plants from all parts of the world. *Primula spectabilis* and *P. Wulfeniana*, which she reported in the first installment of her article in the May-June issue of The Garden Journal had previously refused to flower, burst into bloom this spring. . . . DR. S. L. EMSWELLER, Principal Horticulturist, U.S.D.A. Division of Ornamental-Plant Crops and Diseases at the Beltsville, Md., Station, recently returned from a trip to Holland, greatly impressed by what is being done in that country to further research in horticulture and the results being obtained by their research programs. . . . ALICE (MRS. N. V.) COOKE has a beautiful garden in Ireland which Americans, attending the Rock Garden Conference in 1951 in the British Isles, visited. She is a member of the Royal Horticultural Society and the Alpine Garden Society, and a contributor to their publications. . . . JOSEPH MONACHINO, Associate Curator of the Herbarium of The New York Botanical Garden, is well informed not only on the native plants of this area but on native plants of other locales. He spends his vacation observing plants in their native habitats — this month he and Mrs. Monachino are camping in Glacier National Park. . . . DR. RICHARD A. HOWARD assumed the duties of head of the department of botany at the University of Connecticut in February of this year. He was previously assistant professor of botany at Harvard University. . . . EDITH FARRINGTON JOHNSTON is a well-known author and artist. She is illustrating the MACMILLAN WILD FLOWER BOOK, which is scheduled to be published in 1954. . . . GERTRUDE B. FOSTER is editor of "Herb Grower Magazine."

CREDIT FOR ILLUSTRATIONS

Front cover, colored illustration of the herb garden at The New York Botanical Garden, by Earle Dugan; p. 102, Israel Government Information Service; p. 104, upper, "Flower Grower," center, J. Horace McFarland Co.; p. 105, Curtis' "Botanical Magazine," Vol. XLI, 1815; p. 106, left, The New York Botanical Garden, center and right, J. Horace McFarland Co., p. 109, E. N. Mitchell; p. 110, left, Patrick M. Synge, Editor, Journal R.H.S., right, Royal Botanic Garden, Edinburgh; p. 110, Royal Horticultural Society; p. 112, upper, Reginald Malby, lower, Robert Senior; p. 115, upper right, Harold Epstein, lower, Gottscho-Schleisner; pp. 117, 118, 119, 120, Dr. Richard A. Howard; p. 121, Edith F. Johnston; pp. 129, 130, 131, 132, E. N. Mitchell; p. 133, upper, Ambler School of Horticulture, lower, Mrs. Nicholas G. Roosevelt; p. 134, Mrs. Edgar Allan Poe.

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Water and Land Conservation in Israel

By **Helen M. Fox**

When I travel, I remind myself of the cat who visited the Queen. She spent her time in the royal palace frightening a little mouse under the chair, while I gravitate to the land, to see what is being grown and how.

The most impressive undertakings in Israel today—to me—are the absorption of people from all over the world and the integration of them into a united people; the reclamation of the land and conservation of water.

Jews have come from the United States and Europe, that is, England, France, Germany, Poland, Russia, Roumania, Greece and Italy, also from the Near East, from North and South Africa, and from the deserts of Arabia and the mountains of Kurdistan, from Persia, and I even met two little girls from Burma. These people are like the people of the nations of their birth and speak their languages; some are black, others blonde. In a short space of time, all become hard-working Israelis. The new citizens face a serious task of feeding themselves and of earning enough to buy the food and goods they cannot produce. No one is refused entry so that the able bodied among them have to look after the sick, the old, and the lost children. They all approach their problems with verve and dedication to their cause. Naturally, not all that happens is played in a major key nor does it flow in unbroken rhythms; but, on the whole, the people work in harmony and all of them for the same end.

When the visitor arrives in Israel, he is greeted by "Shalom Israel," which is an abbreviation of the old greeting, *Shalom Aleichum,* and means peace to you in Israel. This greeting has a symbolical meaning, of what the people are trying to accomplish, namely, to live at peace.

For their undertakings the Israeli's have remarkable leaders, men and women well trained in their fields.

Two leaders stand out in reclamation of the land, Amihud Goor and Walter Lowdermilk. The first, whose title is Minister of Forestry, is a graduate of the University of California, received his Ph.D. from Yale, and later went to Oxford. He was born in Israel and, consequently, is known as a *sabre* and is the son of a learned father who wrote a Hebrew dictionary. The Goors are proud of the fact that all of them have gone abroad for their education where they were urged to stay and work, yet all returned to help the land of their birth. Mrs. Goor is a dark vivacious beauty, the daughter of a poet, and drove down from Jerusalem to act as hostess to me during my visit at Ilanoth.

Dr. Goor supervises the sowing and planting of trees in Israel. In order to find trees best suited to the climate, he has traveled to Australia and Africa, and even to the Islands of the South Pacific.

The place for raising seeds and studying about problems related to reforestation is at Ilanoth situated near the sea at the termination of the valley of Esdraelon, now called Emek, where Deborah guided the Jews, where Saul and Jonathan died in biblical days, and here, too, is Armegeddon. Formerly, this was a malarial swamp. Now, the valley has been drained and some of it planted with eucalyptus, which draws up the water, and the drier portions are green with crops.

It is hard to believe this modern, well-planned place at Ilanoth, where the staff lives, in neat white houses each with its own little garden of brightly-colored flowers, is only a few years old, for it is humming with activity. There is an excellent working library, well catalogued; a room for storing seeds with insulated walls, which keep the temperature between thirty and forty degrees all the year around; and many laboratories. The project for determining which is the best time for sowing seeds has found that fall is best for evergreens, March for deciduous trees, and May for acacia and eucalyptus. The tree seeds are cleaned by a young woman and then stored. Today some are being sent out in return for the seeds that have been received from all over the world. The pines being grown are Aleppo, Brutia, and *Pinus maritima.*

Another project is the study of how best to raise local plants from seeds and to find the right soil for them. Natural vegetation grows only in the Wadis, where rain remains longer than out on the desert. There have also been experiments on transpiration. Though there are but two to three millimeters of rainfall in the desert, the plants transpire a lot. This shows there must be water deep down, of which more later. An unusual and valuable experiment is a project for preventing eucalyptus logs, which are sawed for stakes to support grape vines and other garden produce, from being devoured by beetles. This is done by pumping enough strong chemical into the freshly cut logs which absorb it and, consequently, are repellent to the beetles.

At Ilanoth last year, fifteen thousand tons of tree seeds were sown which represent fifteen million plants. The seeds are sown in concrete basins, shaped similarly to our wooden flats, and have holes in the bottom for drainage. The soil in them is either taken from where mushrooms have been grown or dug up from under trees. In about six months the seedlings are big enough to be transplanted into other flats. The transplanting

The modern well-planned nursery buildings at Ilanoth

is done by newly arrived immigrants, mostly from Yemen, who squat on the ground and work quickly with exceedingly deft fingers. In eighteen months from the time of being sown, the trees are big enough to be planted out. So far in four years, four and a half million trees have been planted. When planted along roadsides where they shade the roadway and prevent erosion of the banks, they are watered from tanks until they are established; they then come along beautifully with only the scant rainfall to depend on. Along the roads (which are well kept and give work to unemployed) first at the front are oleanders, then tamarisks (both native to the land and both with decorative roseate flowers), and behind these are the taller eucalyptus. Already wild flowers have seeded themselves under the trees and birds have come to nest.

In some places, as in the Judean hills on the way up to Jerusalem which were formerly rocky and had been denuded of trees for centuries, Boy Scouts and other groups have gone out and planted trees, sometimes having to move a stone to make a place for one. Where the hills are not as yet planted with trees, in March they were bright with patches of anemones and pink cyclamen.

Dr. Goor thinks the trees are needed to help rainfall and prevent erosion where the land is unworkable; but where the land can be tilled, it should be developed into vegetable and fruit gardens similar to California gardens.

The other outstanding conservation leader in Israel is Dr. Walter Lowdermilk, perhaps the greatest soil expert in the world today. He, too, was educated in California and at Oxford, where he was a Rhodes scholar. Dr. and Mrs. Lowdermilk have been in Israel for two years and have asked to be reappointed for two more. They are enthusiastic about the country and by their graciousness and understanding have given great encouragement to the people.

In his book, PALESTINE LAND OF PROMISE, Dr. Lowdermilk outlined what could be done to bring water to the arid parts of the country. The wonder of it is that he has been able to carry out the plans he made, except in the Jordan valley where present political circumstances prevent using the river, because it is a boundary between two countries at war with each other. He says, through his work in Israel, he wants to show the whole world what can be done to restore denuded and eroded land to fertility. Somehow, when one is in the presence of Dr. and Mrs. Lowdermilk, one senses a dedicated approach to a cause that seems holy to them.

In 1948 there were twenty thousand families who earned their living by farming; they cultivated one hundred and eighty-one thousand acres of which fifty-five thousand were irrigated. They produced food for export, notably citrus. Since 1948 the population has more than doubled and now nine hundred thousand acres are under cultivation, but so far only one hundred and twenty-five thousand are irrigated and today only half of the food (but seventy percent of the feed for the country) is produced by the farmers. They have to buy food, feed, and fertilizer. Everywhere experiments are being made to increase the food supply and near Jerusalem, right outside the city limits, broccoli is being grown, fed by processed sewerage. In the Botany Department of the University of Jerusalem, various lichens are being grown to see whether animals could use them as fodder and every possible plant is sought which could provide feed.

Dr. Lowdermilk, being a Californian, realizes the importance of irrigation. In Israel, irrigated land produces about four times as much as the unirrigated.

When I told the Lowdermilks how thrilled I had been upon seeing alfalfa green and lush near Beersheba, where two years ago there had been a desert, they invited me to come north with them to see the great water project. So one morning at seven o'clock, I started out in a car from Haifa and drove past Acre, the town walled by the Crusaders and later won by Saladin, where today minarets of the mosque stand above the battlements and palm trees are tall against the distant hills. When I asked my native *sabre* driver, who spoke excellent English, having been in the Jewish brigade of the British army, why the Israelis did not plant more palms he said they did not give enough shade. On we went to Lower Galilee, past ancient groves of grey-green olive trees and fields colored bright spring-green of winter wheat, and climbed higher, through the most beautiful mountain scenery, towards Upper Galilee, past Safad where the mystical Jews of central Europe had settled centuries earlier. We had to stop upon meeting a shepherd and we smiled at each other, while he herded his flock out of the road. I should have liked to ask him where he had come from, for he looked as if he might have been a teacher back home, but was afraid I might delay the progress of the sheep. On we

went to Rosh Pina where we stopped at a little inn to have Turkish coffee, always a safe drink because it is certain to have been boiled.

Pretty soon along came the Lowdermilks, their car flying the blue and white flag of the United Nations. The day was bright and sunny with a chill in the air, the meadows were painted with patches of brilliant pink, blue, and purple wild flowers, and behind us towered Mount Herman capped with snow. Accompanying the Lowdermilks was a hunter who had killed fifty wild boar that year (they are a pest in the neighborhood). Another passenger was Nathan Gil, Minister of Soil Conservation. Dr. Lowdermilk had three cameras slung over his shoulders to take pictures as we went along. On we drove into this lovely, lush and exceedingly well-watered valley. Part of it is swampy and papyrus grows here—its most northern habitat. The valley is on the border of Lebanon and looks somewhat like an alpine valley in Switzerland, only it is much wider. Water trickles into it from the mountains all around and sometimes pours into it as if in glacial streams. Because of geologic conditions, fertile earth goes down for sixty feet and on top is a layer of peat which could be used for fuel or for fertilizer. The Heulah clover with fragrant foliage is native here. We drove past a large group of Yemenite school children on a botanical excursion with a teacher, to a grove of oaks called "Bash-on" which had been planted by the Templars. Here, beside a lively little brook, an old man was fishing for trout. And under the trees I found a lovely calla lily, and a tall plant similar to lovage and with a good taste.

All this water, including the water from Lake Heulah, called the "Waters of Meron," which is below this valley is being drained to another natural basin a little farther south and then piped as far away as one hundred and fifty miles to thirsty people in the cities and to dry land for irrigation. We drove farthest north in Israel to a village called Metullah right on the Lebanon border. While we were waiting for lunch, a handsome American marine came out and told us the United Nations Commission was "sitting" inside and seemingly coming to an agreement. From Metullah we could look down on more meadows situated in Lebanon, green with wheat and enclosed by snow-capped hills.

Another supply of water comes from the Yarkon River at Tel Aviv, which is drawn off before it reaches the sea and then taken south.

Meanwhile south at Beersheba, which is at the beginning of the Negev, every effort for obtaining water locally is being made. This part was known as the "Wilderness" in the Bible, and here for centuries prophets and holy men took refuge from persecution, while during the last century B.C., the Esseenes lived a primitive form of communism. Rain is scarce there, drought occurs every other year, and only irrigation can produce vegetables and fruits.

Wells were dug, for it was thought, as I mentioned earlier, that water from the Hebron mountains at the north must be deep under the ground. At present water comes from Eres and Niram near the northern part of Gaza. Recently at Beersheba, from one of the wells dug by most modern machinery, water was found at a depth of fifteen hundred feet. It then rose to six hundred and sixty feet, and is said to produce six hundred gallons a minute. Now that this has happened, the people are greatly encouraged and hope to find water from other diggings going on. From this and other wells, it is planned to increase the nearby farming settlements from fifty to seventy-one.

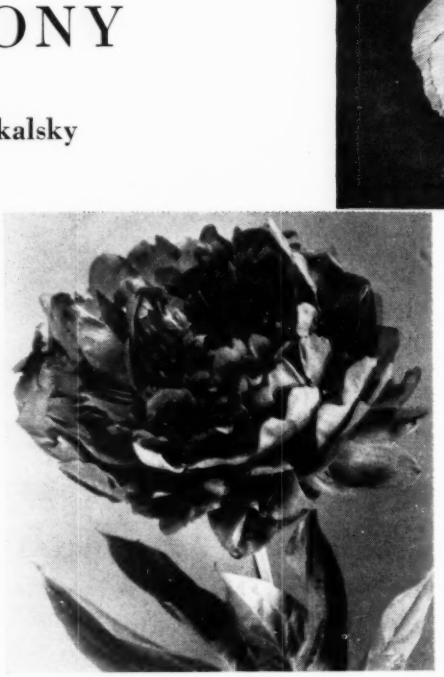
Four years ago Beersheba was a sleepy little border town; today admirable housing projects have gone up and factories have been started to manufacture ceramics and glass. At present, just below the town, Bedouin tents can be seen pitched in the as yet unplanted desert, and camels bring their loads in to the city. On the way north from Beersheba driving close to the coast, one goes by citrus orchards. Other crops grown in this district, which has a fair amount of water and some irrigation, are peanuts, vegetables, and olives. Produce consisting of wine and honey come from here, too. In the land around Lake Galilee, bananas and dates are grown, and almost every farm village in Israel has its chickens and eggs and sometimes cows.

The hopes of future expansion in agriculture are high, due to reforestation and distribution of water, and in a short time the Israelis, under scientifically trained leaders, hope to feed themselves and to be able to export some of their crops as well.

Men and women work diligently in the nursery at Ilanoth

A Brief History of THE PEONY

By **Francis P. Tikalsky**



Above. "Pico," a white single, took top honors in several 1952 peony shows

Left. "Philippe Rivoire," the highest rated red peony, lacks only size to attain near perfection

HONORE DE BALZAC once said in one of his works that "History was fiction agreed upon," so the veracity contained within this thumb-nail version of the history of the peony is as good as previous authors have recorded. The peony is a genus of hardy, handsome flowering plants of the Buttercup Family. The name, peony, is a common word for *Paeonia*, which appellation was given to this plant in honor of Paean, the physician of Greek mythology. The reason for this is simple enough to understand, because the Chinese utilized the roots of the herbaceous peonies for medicinal purposes. Fabulous cures are recorded in ancient manuscripts. The medicinal properties were also expounded by more recent writers. In Hill's BRITISH HERBAL, issued in 1756, it is written that the peony (*P. officinalis* no doubt) ". . . will alone cure that disagreeable disorder, the nightmare." The roots of the herbaceous peonies were also used by the Chinese for food.

Past writers of this beautiful flower seem to be in almost unanimous agreement that *Paeonia albiflora* had its origin in China. The development of new varieties of this species in the early stages is traceable to China. This is determined by piecing together fragments from old writings and noting designs incorporating the flower and the leaves in ancient graphic presentations. So it is fairly well established that the herbaceous peony was grown for ornamentation, food, and medicine prior to the tenth century. There is a definite record in the year of 1596 of at least thirty improved varieties of red, white, and pink colors then in existence in China. Since there are no data to support earlier cultural developments, it has been almost universally agreed that the proto-types of the improved varieties of *P. albiflora* were originated in China. This is the race which we call Chinese peonies, or sometimes *Paeonia sinensis*, more correctly *P. albiflora*. This is the species that is grown so extensively in compatible locations throughout the world.

Very early in the nineteenth century, the very first *P. albiflora* plants were imported into England from China. These were given names and a few of the more important ones of that group were *fragrans, Whitleyi, Humei*, and *Pottsi*. The great beauty of their blooms, reliability, hardiness, and easy culture attracted and impressed the European horticulturists and aroused a universal desire to originate improved varieties. Up to the present this urge, or ardor, to develop better varieties does not seem to have dampened one whit. About a century and a half has passed since the peony was introduced to the west, and the number of the improved varieties that has found its way into gardens is almost beyond comprehension. A reliable authority has estimated that at least five thousand of them have been imported from abroad and originated in this country, since the peony was first planted in the European gardens. A relatively small amount of these are worthwhile, the remainder are only monuments to the zeal and verve of the originators.

The first truly great improved *P. albiflora* to flash across the horizon of peonydom was "Festiva Maxima," originated by a rather obscure horticulturist, Miellz, in 1851. What a feast this very large, fragrant, well-formed white must have been to the gardeners of that time! This truly outstanding flower has withstood the onslaughts of the vicissitudes of time and tastes for over one hundred years and at present enjoys a rating given in the last symposium of 9.3 out of a maximum possible rating of 10. This certainly entitles this variety to continue to hob-nob in the king's row with the highest of the nobility in peonydom. "Festiva Maxima" remained undisputed monarch for thirty-seven years, in spite of the concerted efforts of the best European hybridizers, until a variety came into being that challenged her regal right. This variety was "Mons. Jules Elie," a huge

chrysanthemum-formed, light rose-pink. This stellar variety was originated by Crousse. However, when it received a symposium rating of 9.2, it was one tenth of a point shy of equalling the incumbent queen. In 1904, or fifty-three years later, "Festiva Maxima's" uncontested reign ended, when Dessert introduced "Therese." This was the first outstanding creation of this gifted wizard. The flower is gigantic, splendid in form, and the color is a translucent old-rose pink. It maintained a rating of 9.8 for many years. Simultaneously with the introduction of this jewel of the first magnitude, a very capable American hybridizer, Richardson, brought out "Walter Faxon." This variety is a vivid shell-pink of luminous intensity, unique and very rare in peonies. This truly was a color break and remained a standard to emulate or surpass for nearly forty years. It was given a rating of 9.3 in the symposium, which it rightfully deserved.

Up to the turn of the twentieth century, a great number of European plant wizards were at work, prodigiously developing new varieties, and as a result of this, commerce became cluttered with inferior and mediocre peonies. A point was reached where only a very few growers paid much attention to named varieties, and the odds were extremely heavy against a purchaser obtaining what he or she had ordered. The very first project undertaken by the American Peony Society, which was formed in 1903, was to correct this condition, provide nomenclature, and bring order out of confusion. Cornell University agreed to work in collaboration with the American Peony Society to effect this end. The University furnished the land at Ithaca, New York, where thirty-five hundred roots were planted representing one thousand nine hundred thirty-three varieties. Professor John Craig was appointed to supervise and direct the work at the test gardens and J. Eliot Cloit to assist him. These two integrated the final results and the third and final bulletin was issued in 1912. This established a nomenclature, which included a description of all varieties then in commerce. A symposium was formulated somewhat later by the American Peony Society and all peonies then in commerce were given a rating. The "Peony Manual" was published in 1928. It was recognized at that time that there were too many inferior varieties in commerce, so it was decided to recommend discarding all peonies that had received a rating of less than 8. The "Peony Manual" did not include these in the descriptive list for Chinese peonies; an exception was made by a vote of the board on a few varieties. The American growers responded practically en masse,

Paeonia albiflora **was grown in China prior to the tenth century for ornamentation, food, and medicine. Drawing "from a plant communicated by Messrs. Chandler and Buckingham, nurserymen at Vaux Hall; introduced in 1784 by Chevalier Pallas."**

and soon the skid-row candidates disappeared from the catalogs and, eventually, from commerce. At present it is difficult, indeed, to obtain any of these culls from commercial growers.

With hybridizers still engaged in pursuit of the ideal dream peony, the number of varieties is ascending to astronomical figures, and the time is not far off when some corrective measures will again have to be applied. The one logical solution that looms on the near horizon is to elevate still further the requirements for worthwhile varieties.

From 1904 up to the present, many outstanding improved varieties of *P. albiflora* began to appear in copious quantities. "Le Cygne," with its perfect form was brought out in 1907. For a great many years it had a rating of 9.9, just a whisper shy of perfection; but some found it to be somewhat temperamental, and subsequently, the rating descended from its stratospheric height. It still is unsurpassed in sheer beauty when well grown. "Solange," with its coffee-cream coloring not common in peonies, was introduced the same year. Its original high rating of 9.7 descended, too, because it was found to be temperamental. Then came two American creations, "Martha Bullock," a bright rose-pink of tremendous size, and always in the prize-winning class, particularly up North, and "Longfellow," a reliable red. Following these came such regal members as "Mme. Jules Dessert," "Kelway's Glorious," at present the highest rated peony, "Tourangelle," and good "Philippe Rivoire," still the highest rated red, that lacks only size to be close to perfection itself.

The French originators monopolized the field in producing high-quality varieties for over twenty-five years; then the Americans came to the forefront and took over the reins. These were, to mention just a few, Brand, Shaylor, Franklin, Saunders, Gumm, Sass, Vories, Auten, and Glasscock. Between the years 1930 and 1931 a trio of the most elite in peonydom was introduced by American originators. This great trio was "Elsa Sass," "Mrs. F. D. Roosevelt," and "Nick Shaylor." American hybridizers still retain the lead. In a few subsequent years, they brought out "Tempest," "Kansas," "Mandeleen," "Victory," "Dorothy J.," "Margaret Lough," "W. L. Gumm," "Dr. J. H. Neeley" and "Moonstone." In this same period, three outstanding Japanese types were introduced into commerce. These were "Westerner," "Dignity" and "Lotus Queen." The superb single, "Pico," made its debut, also, at that time. Possibly the very best semi-double, "Miss America," came in the same period. Very recently, the peony connoisseurs saw "Doris Cooper" and "Ann Cousins," a pair that holds promise of being included in the upper strata of peony society.

As a great number of new originations are introduced, the trait of

Right. The fragrant "Festiva Maxima" has stood in high favor for a hundred years.

Left. "Kelway's Glorious" is presently the highest rated peony.

Below. "Le Cygne" for many years enjoyed a rating of 9.9, just shy of perfection.

distinctiveness is extremely difficult to attain. At present, the difference in many of them is so slight that it is sometimes hard to identify them. Three outstanding, painstaking, and serious American hybridizers visualized that the saturation point of distinctiveness would soon be reached. To achieve something that was a wide departure from the current varieties, Saunders, Glasscock, and Auten started to cross the *P. albiflora* and *P. officinalis* species several decades ago. New blood was introduced and sensational colors appeared. These vibrant colors are very unique and a radical departure from those seen in the *P. albiflora* peonies and can be readily detected from those of the latter from quite a remote distance. Some of the most outstanding of the *P. albiflora* X *P. officinalis* are "Laura Magnusen," a vivid and vibrant true pink; "Red Charm," a fine formed red, sans any blue casts; "Cherry Red Hybrid," a red of distinction; "Chocolate Soldier," a chocolate color definitely with a deep shade of brown; and "Robert Auten," a real humdinger, that is a very dark red. The wonderful results that were attained in such a relatively short period of time clearly spells out the tremendous possibilities that remain in this almost unexplored field.

It is an interesting question whether any other blood than that of *P. albiflora* has gone into the making of the wonderful flowers of the Chinese type, that have been grown so extensively in our gardens. Some competent authorities made and recorded statements, that these improved varieties were the result of crosses with the European species, *P. officinalis, P. peregrina* and others, with the original varieties imported from China. Professor A. P. Saunders, one of the most outstanding authorities on hybrid and species peonies, wrote a comprehensive article for "Peonies," the American Peony Society's Manual, which takes a diametrically opposite view. He states in the article, Peony-Breeding, sic: "If we turn to consider internal evidence, we fail to find much support for the view that *P. officinalis* blood has gone into the production of Chinese peonies. A characteristic of *P. albiflora* type, as of the whole race of peonies derived from it, is that it bears several flowers to a stem, whereas *P. officinalis* bears only one. The root system of *P. officinalis* consists of a group of fusiform tubers attached to a crown by thin strings. In the Chinese peonies, on the contrary, the roots thicken toward the crown, the whole root system is rigid, and one never sees anything to suggest intermediate forms. The foliage of the Chinese peonies, further, shows no likeness whatever to that of the *officinalis* varieties but does have the general character of the wild *P. albiflora.*

"Moreover, during the past ten years I have raised a considerable number — about fifty — between the Chinese peonies and various forms of the *officinalis*; and while the strain shows on one hand a distinct departure in general type from *officinalis* parents, it differs more distinctly from its *albiflora* ancestry. The leaf character is nearer *officinalis*; the root system is intermediate between the two, but has preserved the character of *officinalis* in its ability to form buds on root fragments, a power almost lacking in Chinese peonies. In short, no one comparing this group of plants with a group of ordinary *albiflora* varieties could believe that they were of the same parentage." Incidentally, *P. officinalis* is the old early flowering "Piney" that grew in our grandmothers' gardens so plentifully before the turn of the twentieth century.

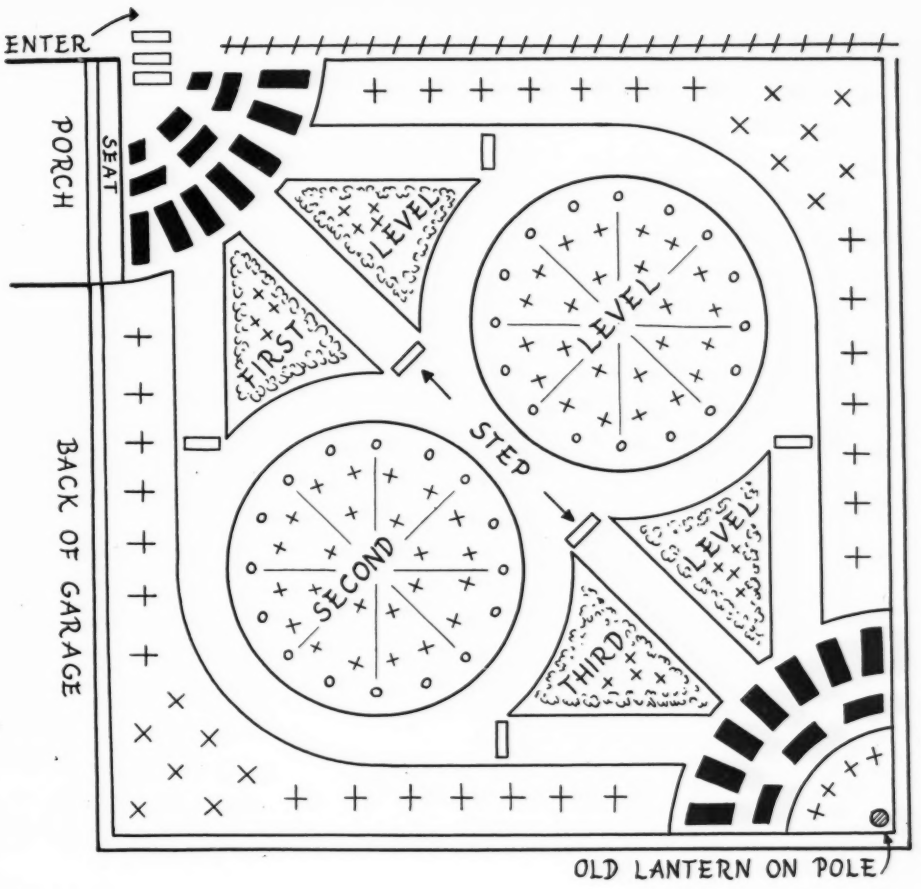
There are other species peonies besides *P. albiflora* and *P. officinalis* in the herbaceous group, perhaps two dozen or more; but since they are not too widely or extensively grown, the space allotted does not warrant going into detail. However, it is interesting to mention *P. Brownii* found growing in the snowy region of the Sierras of California. It is the only native American species, a small-flowering type, about one inch in diameter, the color a dull dark red.

Botanists distinguish a number of peonies with woody stems from many species which are herbaceous. Best and longest known of these is the common or *Moutan* tree peony, the name being derived from Chinese *mou-tan,* or *muh-tang,* or *meutang.* (*P. suffru-*

(Continued on page 122)

Grandmother's Garden for a Flower Show

By Bert Hobart



THIS is the story of a very, very, old-time herb garden. To understand the story, we must go back to "Grandma," who settled long ago in Clarence Hollow, New York, now known as Clarence.

"Grandma" brought and left to the town her cherished herbs, produce of those early English gardens from across the ocean. She left, too, her old-time graceful way of life, warm friendliness, and the "McCoy" of cooking. These things still prevail in the heart of the thriving up-to-the-minute village.

In the fall of 1951, my family and I moved to Clarence and shortly thereafter I joined the Clarence Garden Club. At that time I hardly knew the difference between an herb and a weed, so I was delighted when the club decided to study herbs.

We read many books on the subject, that winter, until at last our heads were very much in the clouds. So it was with the vision of walking paths of creeping thyme and gathering armfuls of fragrant lavendar, that I boldly volunteered to have an herb garden for the Clarence Garden Club show on August 31, 1952.

Warnings of other growers that it "can't be done in one season," sifted through to us those days, but by that time we were, as my son said, "really gone" and could not give up the project.

I was fortunate in having an ideal setting for the garden—a twenty-four foot square, sandy soil, a sunny slope, a big pile of rocks available. Then there was the white concrete wall on two sides, the garage and porch on a third. Here would be a walled Elizabethan garden, with summerhouse (the porch) to overlook it as of old.

First, I engaged a man to come with a roto-tiller and "tear up all that good grass," as my husband put it. Then, finding a jewel of a colored man by the name of William, who was tireless and keenly interested in what I was trying to do, the work began.

Thereafter, any Saturday I could be seen "on location," my carefully-drawn design in one hand, to appease my engineer husband; a yardstick and string in the other, to satisfy myself.

At the stroke of seven, that first Saturday, William arrived. Soon he had converted the slope into three terraces. A thirty-inch wide center path was then laid out, from the corner of the porch to the corner of the wall opposite, beginning and ending in a semi-circle. Stepping stones were sunk in this area, and steps made to take care of the difference in ground level.

With the aid of my trusty string, the large, round, raised beds were formed on either side of the middle terrace. At this point, William's face brightened. He was delighted to discover that after all, I really did know what I was doing. He never suspected that I, myself, had undergone some doubtful moments.

Following the geometrical design, smaller beds on the two other levels were soon in shape, as well as the eighteen-inch pathways, giving access to the outside square. This outside bed ran clear around the plot, ending in a long, low seat, just below the porch. A small picket fence finished the open end of the garden, leaving room for three stone steps at the entrance.

Topsoil was hauled in at this point —and I really did say topsoil. The popular belief is that herbs grow better in poor soil—that rich ground makes lush growth, but little fragrance. We had lush growth, but according to comments at the show, there was also an abundance of fragrance everywhere.

Now William's big job was at hand —hauling and laying the rocks around the beds. "I really know my rock work, Miz Hobart," he said. "You can relax now." This I proceeded to do, thinking that soon my order of herbs would arrive.

The middle of May, I finally received a small lot—five herbs, to be exact, looking none too healthy. Of course, I would get the rest later! "Plenty of time to plant," they said.

(Continued on page 122)

Horticultural Commentary

Lime As a Soil Conditioner

By **T. H. Everett**

In all the hullabaloo that we have had during the past year or so on the subject of synthetic soil conditioners, I have seen no reference made to a natural conditioner that if wisely used can work wonders on clay soils—I refer to lime. Yet this material has been long and satisfactorily employed by knowledgeable agriculturists and horticulturists as an amendment to improve the structure of heavy soils.

Because lime is an alkalizing agent, the attention of amateur gardeners has been focused almost entirely upon its value as a corrective of excessive soil acidity; the other virtues it possesses have passed largely unnoticed. These include the provision of the element calcium which is essential for plant growth, the release of mineral nutrients that otherwise would remain in the soil in forms unavailable to plants, and the stimulation of desirable biological changes in the soil.

My concern at the moment is not with these other advantages of using lime intelligently, but is confined to the benefits to be obtained by making effective use of its flocculating powers.

Let me say here that lime does reduce soil acidity and so must not be employed where decidedly acid-soil plants such as rhododendrons, azaleas, and blueberries are to be grown, and also that its excessive use can be detrimental to plants that normally respond favorably to its application. Harmful results are very unlikely to occur on heavy soils or on those which contain an abundance of organic matter. Chlorosis (yellowing of the foliage) resulting from the use of too much lime is usually confined to plants growing on sandy soils.

But to return to the flocculating powers of lime. Clay, by definition, consists of extremely small particles, of particles that do not exceed one five hundredth of a millimeter in diameter. In fact, they range from this maximum down to almost molecular magnitudes. The smaller ones, those less than one thousandth of a millimeter in diameter, are said to be of colloidal size and form the colloidal clay fraction of the soil. It is this colloidal clay that is chiefly responsible for the typical characteristics of clayey soils. Thus if we wish to control the physical state of such soils, to "condition" them to our advantage, we must know about practical management of colloidal clay.

Matter divided so finely that it is of colloidal size assumes certain peculiar properties; it will, for instance, remain in suspension in water indefinitely. Each separate particle is so very small that it will not sink even in still water. This is true as long as the particles remain separate. This is true of colloidal clay.

However, a phenomenon known as flocculation occurs under favorable circumstances; the particles coagulate to form much larger aggregates or floccules, and these quickly come out of suspension. The colloidal matter that previously consisted of vast numbers of individual small particles now, in effect, is formed of much fewer larger granules. Thus colloidal clay exists in two states: flocculated, when crumb-like in structure; deflocculated when particles are not aggregated.

Deflocculated clay is plastic and "gooey" and does not permit the free passage of water and air. It is fine material with which to line ponds and dams and out of which to make bricks but it is a mighty poor rooting medium for plants. The cultivator of heavy soils must make every effort to maintain the colloidal clay fraction of his soil in a flocculated state. He can promote this condition in various ways—by not walking, trucking, or working over it when it is wet, by avoiding the use of certain fertilizers, such as nitrate of soda, that have a deflocculating effect on clay, by plowing or spading in the fall so that a surface of rough lumps is exposed to the ameliorating effects of winter frosts, and by adding flocculating agents, the most important of which is lime.

To get some idea of how lime brings about flocculation, take a quantity of the purest clay you can find, tie it in a piece of cloth and slosh it up and down slowly in a pail of water until the water is thoroughly muddied. Allow the water to stand until any comparatively large particles that it contains have sunk to the bottom, then pour off the liquid into two glass containers. To one add a little hydrated lime and stir. Let the other serve as a control. Immediately the clay particles in the container to which lime has been added will coalesce into easily visible crumbs and sink to the bottom. The colloidal clay is now of granular structure with spaces between the granules. This coalescing takes place when lime is added to clay soils in the garden or field, but at a slower rate. And when the colloidal clay fraction of a heavy soil is in this flocculated condition, air and water pass readily between the granules.

But lime acts as a soil conditioner in ways other than its effect on colloidal clay. It serves to stimulate the processes that convert organic material into humus and the clear evidence is that it tends to eliminate some intermediate organic products that are possibly toxic to plants. It encourages, too, the multiplication of most favorable soil organisms, including those which produce usable nitrates from organic matter and those which fix free nitrogen from the air.

The use of lime to condition clay soils is no new concept. In lectures and writings, I have advocated this for many years and have put it to good practice. Throughout almost the whole of my gardening career, it has been my lot to work heavy soils and on several occasions I have been called upon to bring into production examples that seemed well nigh hopeless. Liming has always played an important part in their conditioning.

Two instances in the recent past give point to these thoughts. A couple of years ago I was asked to advise on the treatment of a large "gooey" mass

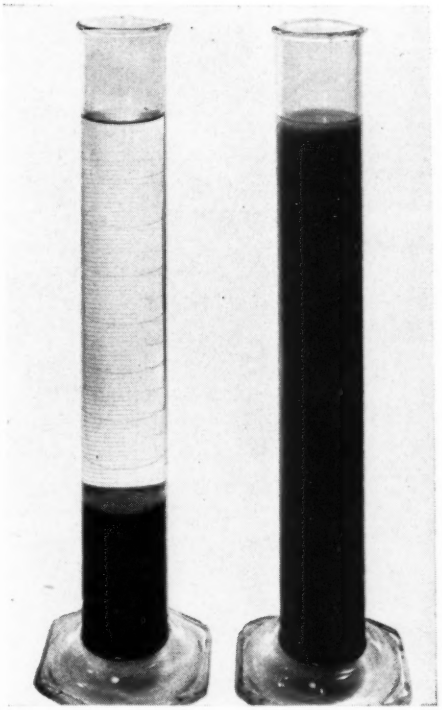
of clay and silt that had been dredged from the bottom of a pond. To the owner of the estate it looked hopeless. That it could be converted into topsoil that would support a lawn seemed impossible. It was fall. The "goo" was spread in a layer a foot or more thick, was limed, fertilized (with an ordinary 5-10-5 fertilizer) and sown to winter rye. No manure or other organic matter was added. The rye germinated and grew somewhat erratically and in spring was turned under. More lime and more fertilizer were applied and Italian rye grass was sown. This grew into a good stand, was kept mown to form a temporary lawn, and in late summer was turned under. By early fall the sticky ooze had been converted into a very creditable topsoil that would certainly support a lawn. It was of granular structure and immensely improved by the treatment it had received. It was limed and fertilized again, and permanent lawn grass was sown with satisfactory results.

Last year I was asked to inspect a large barren area in the public park land to the right of the Whitestone Bridge as it is approached from the Bronx side. I was told that this area presented a special problem as attempts to grow grass on it had failed over a period of several years. Recent experiments with synthetic soil conditioners, I was told, had not given particularly promising results.

As always when I set out to investigate an unsatisfactory soil, I took a spade along, for I like to know what is underneath as well as what the surface condition is. Digging a few holes immediately revealed that the soil was waterlogged and needed draining. But my inspection also clearly showed that the soil was a mixture of silt and clay, the clay obviously in a seriously deflocculated condition. I furthermore was quite certain that it was almost totally devoid of available nutrients. I recommended that the area be drained, that it be heavily limed, that a complete fertilizer be applied, and that a cover crop of rye grass or buckwheat be sown and later turned under, and that this procedure be repeated once or twice until the soil attained a satisfactory physical condition. I have not had occasion to inspect that area since, and the remainder of my story is not connected with it. However, in the March-April issue of The Garden Journal, my colleague, Dr. P. P. Pirone, presented pictures of the same area that clearly demonstrate the improvement later obtained by adding lime, fertilizer, and a synthetic soil conditioner before sowing a cover crop of rye grass.

My story concerns a truckload of the same soil that I had brought back to The New York Botanical Garden and spread to a depth of eighteen inches or so in an excavated coldframe. It was about as unpromising a plant growing medium as one could find. When wet, it was a sticky "goo"; when partly dried, it broke down into greasy lumps; when dry, it formed hard brick-like pieces. It looked absolutely barren.

I divided the coldframe area into two parts. To one, I added coal cinders, lime, and a complete fertilizer; to the other lime and a complete fertilizer only. I then sowed rye grass. It did not germinate very well but some grew. As soon as it was six inches or so tall, I spaded it under, limed, and fertilized again, sowed buckwheat, and got a good stand. I was in Europe when this was high enough to turn under and so the Head Gardener attended to this chore and sowed a second crop of buckwheat. In the fall this was spaded in, lime and fertilizer were applied once again, and winter rye was sown. Like the buckwheat that preceded it, it made splendid growth and still occupies the ground. It has been kept mown this summer. Digging into this rye grass lawn reveals that what was previously a sticky mess of inhospitable clay and silt is now a splendid granular topsoil that is thickly permeated by healthy roots of grass. This conversion has been made by the use of lime and fertilizer alone; there is no difference in the appearance of the rye grass between that on the patch to which coal cinders were added and that without them.



Experiment to show flocculation of colloidal clay. Two glass tubes were filled with a suspension of colloidal clay. This picture was taken five minutes after hydrated lime had been added to and stirred up in the tube on the left; the clay is now of granular structure.

While the addition of coal cinders on my test plot seems no advantage, it might well prove so under certain practical conditions. The gritty character of cinders effects a permanent mechanical improvement in soil texture; the improved texture resulting from the flocculation of colloidal clay by liming can be destroyed by mishandling the soil afterwards—notably by trafficking across it or cultivating it when it is too wet.

So much for the benefits that accrue from the use of lime as a soil conditioner. Now we may consider the forms in which it may be applied. The two most commonly available are ground limestone and hydrated lime. The former acts more slowly and more of it is needed to effect the same result. The finer it is ground, the more quickly it acts. Ordinarily you should not consider as suitable limestone that is coarser than a sample all of which will pass through a 10-mesh screen and at least half of which will pass through a 100-mesh screen. Roughly one and a half times as much ground limestone as hydrated lime is required to do the same job. For very sticky clay soils I prefer the hydrated lime.

The amount of lime to use is largely a matter of judgment and may be based, to some extent, on an acidity test. For most plants it is not desirable to bring the pH factor materially higher than 6.5. A heavy dressing of dehydrated lime on a stubbornly deflocculated clay may consist of as much as ten pounds to each hundred square feet.

Gentiana Lagodechiana

Silene acaulis

Rock Garden in the Mountains - II

By **Clare W. Regan**

THERE is nothing more endearing in the rock garden than the small aquilegias. Their beauty is always gentle and refined and has a fragility not borne out by experience. They are really very tough characters and extremely long-lived, when grown in circumstances of which they approve. Several in my garden have lived to the advanced ages of seventeen and twenty years! Here we can hold up our heads with the very best that Europe or Asia has to offer. Our Montana *A. Jonesii* illustrates this perfectly, being just a fluff of pale turquoise leaves in spring, with buds arriving simultaneously. These soon open into bold dark blue flowers, entirely too large for the one-inch stem. The lovely light blue and white *A. scopulorum* is at home on the high sandstone and limestone screes of Utah. The leaves are fine and ashy, with light hairs, and the flowers have such enormously long spurs that they look like butterflies hovering over the plant. The small *A. pubescens* has greenish-grey, hairy leaves and little, but quite perfect "columbines" of medium blue. It hails from a high mountain in Nevada.

The little and very modest *Aquilegia saximontana*, coming from Colorado, turns its bright blue and white flowers coyly toward the crevice, where it likes to dwell, or hides them under the pretty green foliage. Another from the same state, *A. Barnebyi*, recently discovered by H. D. D. Ripley and Rupert C. Barneby, and named for one of the discoverers, goes to the other extreme. Literally with flying colors, this aquilega shows off its pink and rose blooms on long curving pedicels, which arch outward and bear the tassel-like flowers in very open sprays. This plant is a little too tall for the rock garden proper; but quite by accident, the plants sent me by the discoverers were put into an annex reserved for natives and near some tall vividly blue penstemons. The resulting plant-picture was beautiful, the plants complimenting each other, both as to color and form.

The native aquilegias of Japan do not have charm derived from grace but, nevertheless, have delightful personalities. Their leaves are usually glaucous and the flowers carved, it seems, from wax with careful precision. The spurs are very short. *A. flabellata* is the loveliest, white with faint traces of blue, and of truly sculptured appearance. The little dark-colored mounds that are *A. Faurieri* in springtime look as if covered with purple plums; *A. amurensis* and *A. akitensis* are blue and white. If the Japanese aquilegias have short spurs, their cousin in Siberia has gone further and tucked them behind the bloom, rolled up like the shell of a snail. This is the very beautiful *A. jucunda (glandulosa)*, whose clear white and blue flowers are held horizontally like those of a jonquil. Going into China and the confines of Tibet, we find small and delightful *A. ecalcarata* has reached the ultimate and discarded spurs entirely. The flowers are little globes of maroon suspended at the ends of curving pedicels, exactly like Chinese lanterns. The tiny leaves are dark green, and the leaflets are rimmed with maroon.

From the southern hemisphere come two oxalis. *O. enneaphylla* from those cold and stormy islands, the Falklands, in the southern Atlantic has leaves which are a lovely glaucous-grey and fan-pleated, and flowers which are shadowy white with a greenish tinge. The other, *O. adenophylla*, is more green as to leaf and bears larger flowers of pink. It comes from the farther-most tip of Chile near the Straits of Terra del Fuego. I could never keep over winter that strange and weird flower, *Calceolaria Darwinii*, from the same locality. Deep yellow, mahogany and white in color,

it is said by its introducer to be "between an insect and a gnome." But I did have *C. polyrrhiza* for several years, whose baggy flowers of soft yellow freckled with red bloomed as well, I thought, as in its native Chile. *Anemone magellanica* and var. *Lesseri,* cream and rosy pink respectively, do well here. Once I owned *Primula magellanica,* hardy but short-lived. Add the dwarf, fine-leaved shrub, *Margyricarpus setosus,* to the above list and it embraces all the plants from the southern hemisphere that have been in any way successful. This plant lives on the dry hills of the Andes and from the white berries, which form after blooming, it is called pearl berry.

An unusual plant that bloomed last summer for the first time is *Meconopsis integrifolia.* This gives the impression of a short, stocky thistle with large silky yellow poppies held downward on the ends of curving stalks. Everything about it is prickly—it is hazardous to collect the seeds without gloves. Another rather odd plant that had been forgotten for years—it had been thrust into a corner as a seedling—produced a flower last summer which was a mystery for some time. It had large bells of translucent greenish white with odd markings in the interior which, of course, was a clue to its identity. It was *Fritillaria pallidiflora.*

It is almost impossible to make a choice of the small dianthus in the garden to describe here, but by-passing the better known species such as *D. alpinus, caesius, Roysii, neglectus,* I can include some not so well known. I like to call them "the little pinks"—which is not scientifically correct—but dianthus is much too formal, in the every-day life of the rock garden, to apply to such friendly and flamboyant personalities. *D. microlepis* was the very first of the very small tuffet or concise cushion types that I owned. It is very silvery and is beautiful when the clear pale pink flowers cover the whole plant. It is a native of Bulgaria. From the same country comes *D. Musaliae,* similar but with deeper, richer blooms, that are produced as lavishly as are those of its relative above. There are now seedlings in the garden of *D. scardica pumila* which will, I hope, bloom this summer and will, I think, be much like the preceding. More charming and much rarer is *D. simulans*; this is as tightly constricted but grows from a trunk-like stem that is semi-procumbent. It needs stone chips under the foliage for protection from dampness. The stiff little leaves are greener than the above and the flowers the softest shade of pink, approaching salmon. It is said to grow only on one mountain top, Ali Butusch on the Bulgarian border; with so limited a locale, and the fact that it scarcely ever seeds and is very difficult to grow from cuttings, *D. simulans* will probably always remain scarce.

Dianthus callizonus resembles *D. alpinus* somewhat but is far less easy to keep. It, too, has wide blooms of delicate pink, sometimes an inch and a half in diameter. The name is given because of the zone of dark red markings in the center of the flower. *D. glacialis* makes the neatest of small tufts, very green and grass-like; the flowers are a lavender-pink, not so pure in color as the other dwarf pinks, but very acceptable as they are the first to appear. *D. myrtinervius* looks like a thyme, making flat, trailing mats of small green leaves covered with wee pinks, about one-fourth inch wide. It was formerly called *D. Peristeri* from the Greek mountain where it was discovered. *D. hamaetocalyx* is a lovely thing, with blooms of brilliant rosy red paling toward the center. The calyx is dark red and the foliage is steel-grey and almost prickly to the touch. The flowering stems are decumbent. This dianthus blooms from July into September, longer than any other of its kind. The lovely *D. sylvestris* is well known but now must be spoken of as *D. inodorus.* The type has circular pink flowers on rather long stems, over a small cushion of grassy leaves. Two years ago I received seed labeled *D. inodorus grandiflorus.* When it bloomed last summer, it could be seen that this was no nurseryman's exaggeration. With good cause, it could have been called

Gentiana Farreri from a painting by Reginald Farrer in the possession of the Royal Horticultural Society

"superbus" as well. Over a two-inch tuft of green, about twenty stems bore gorgeous round blooms of the loveliest color, new in a dianthus, somewhere between light wine and cerise. It was easily the most spectacular thing in the garden.

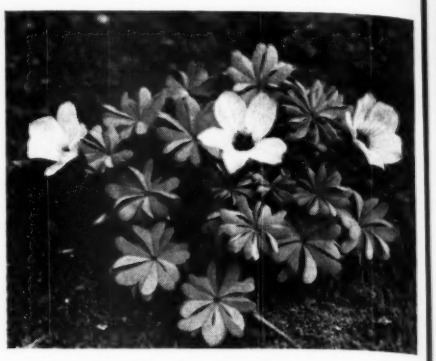
War lays a chill hand on many human activities, and even the gentle art of gardening suffered reverses which will take years to repair. Rock gardening especially lost heavily; most of its choicest plants disappeared during the war years with small hope of replacement in the near future. So it is that my rock garden now lacks the beautiful, small "canterbury bells" of *Campanula Allionii;* the crisp, steel-blue stars of *C. cenisia*; the light blue bearded bells of *C. Raineri*; and that lovely small trinket, *C. Zoysii*. These were hardy, but having lived out their short lives could not be replaced. Now, however, seedlings of several of these and others are in the seed beds and hope is once more aroused that the rock garden will again have some of these choice plants.

Campanula betulaefolia is from Persia (Iran), and its bright green leaves are said to resemble those of a birch; the flowers are large, wide tubes, varying from white to pale pink. The buds are exquisite, being a deep pink. This is a small plant not over two inches high. The other extreme is taken by *C. stenocodon*, whose frail manner of growth and narrow violet bells belie its real character, which is one of the utmost dependability and good nature. At blooming time it is a solid mass of color and makes a lovely picture with its neighbor, the beautiful waxen harebell, *C. Hostii alba*. This is a robust plant about three times the size of *C. rotundifolia*, when in bloom, though the plant itself is not as tall as the ordinary harebell. Another Iranian is the rock-loving *C. petrophila*, a procumbent mat of trailing stems with silvery cups of medium blue. This plant does not like to live in a level position and will do its best only among rocks or in a crevice. The little *C. Tommasiniana* from Adriatic regions is a frail plant with narrow dark blue tubes. From the same region comes *C. Waldsteiniana* that produces, in late summer, a perfect forest of thread-like stems, each bearing a wee star of palest violet. That is, if it is put up among rocks; otherwise it sulks. *C. Stansfieldii* and *C. Wockii* are hybrids, both small, the former with yellowish foliage and lavender-blue bells, the latter with open violet star-bells held erect. *C. sarmatica* (Poland) grows to ten inches but is still a very attractive plant and not too large for the rock garden. It presents a very pleasing appearance in the delicate association of ashy grey leaves and pale blue bells arranged in a somewhat pyramidal fashion.

To my mind the beauties of the race come from the Caucasus. *C. Saxifraga* is my favorite of all the campanulas I have, or have grown. It is chiseled in form and sumptuous in color. It really does not look like a harebell but like a small purple lily with reflexed lobes, almost two inches across. The color is a rich red-purple and the texture is similar to what we described in times past as "a heavy ribbed silk." *C. bellidifolia* is smaller but very floriferous. My one plant had at one time two hundred twenty-two blooms—quite a beautiful sight. *C. Aucheri* (Iran) has almost the same luscious color as *C. Saxifraga,* but is more of a tube and is smaller.

Campanula Hostii

Campanula Allionii



Oxalis adenophylla

The spring-blooming gentians have never done very well for me, but the mid-summer species and the fall bloomers do exceedingly well. Such clusterheads as *Gentiana Lagodechiana, G. Purdomii,* and *G. septemfida* make lovely patches of blue after the campanulas are gone, though, of course, the color value is entirely different. *G. Farreri* is spectacularly beautiful; it makes long perfect trumpets of the purest azure-blue, almost translucent in appearance. Set as they are among grassy tuffets of narrow leaves, they present an almost breath-taking sight. After *G. Farreri* has left the scene, its place is taken by the almost equally dazzling *G. sino-ornata,* whose peacock-blue trumpets rival the blue depths of our mountain skies. The blooms of both plants are flaring, being about one and one-half inches wide at the mouth and over three inches long. With the wonderful floriferousness both plants display, it can be easily seen that the last flower-pictures of the year are the most brilliant of all and calculated to remain longest in the gardener's memory.

Campanula Waldsteiniana

Advances in Horticultural Science

By S. L. Emsweller

HORTICULTURE, as it concerns ornamental plants and flowers, has until fairly recently been practised as and art rather than a science. Methods of growing plants were developed by long years of experience and, generally speaking, successful gardeners had their own secrets as to soil mixtures, watering, and other practices. These secrets were usually handed down to relatively few associates—there was not the free "give and take" that now exists among gardeners.

Gradually, a scientific point of view was adopted that recognized the impossibility of any one individual being an entomologist, a pathologist, a physiologist, and a geneticist. The scientists became interested in discovering why plants behave as they do, what conditions favor growth, flowering, and quality, how to flower plants out of their normal season.

At the present time, horticulture is actually concerned with the application of all the sciences and it calls upon pathologists, bio-chemists, anatomists, entomologists, physiologists, cytologists, geneticists, and even physicists to aid in solving its problems. Research on plant problems is now a matter of team-work; the lone-wolf research worker is greatly handicapped compared to the man who closely cooperates with well-trained individuals in the other scientific fields.

Scientific research in ornamental horticulture is still in its infancy and there is much to be done. Very fine work is under way in many of the state experiment stations, universities and colleges, botanical gardens, and such institutions as Boyce Thompson Institute for Plant Research. It is obviously impossible for me to cover all phases of research, and so I shall limit myself to some of the work in my own Division in the U.S.D.A.

First of all, I want to discuss the work of my colleague, Dr. H. A. Borthwick, on the effect of light on plants. We all know that green plants must have light in order to remain green and to carry on the processes necessary for growth. The light need not be from sunshine; it can be from a carbon arc, fluorescent tubes, or ordinary mazda bulbs. There are underground rooms at Beltsville in which plants can be grown from seed to seed without ever being exposed to daylight. There are outdoor houses equipped with artificial lights and with tracks on which small cars run, carrying plants in boxes or pots outdoors to be exposed to sunlight for part of the twenty-four hour period, then rolled into the house and exposed to additional illumination for any desired time. By means of these facilities, it is possible to study the effects of varying amounts of both daylight and artificial light and to compare the effects of various types of artificial light.

The effect of light on some plants may not appear until months after the light treatment has been applied. In the case of azaleas, the variety Hinodigeri was exposed one year to mazda light for nine, twelve, fifteen and eighteen-hour periods for six weeks. The treatments were applied when flower buds for the next year were being formed. The plants were kept outdoors until cold weather, then placed in a greenhouse and forced. Straggly branching growth resulted from the longer exposures to artificial light; the shortest plant had the nine-hour period light treatment.

Many plants have been popularly called short-day or long-day plants, for example, chrysanthemums that flower in the fall as the days become shorter. Poinsettias also flower at Christmas because of short days. We are now, however, calling these plants long-night plants. If poinsettias are exposed to short days and long nights they flower; but if they are exposed to the same short day and then at midnight are exposed to artificial light for only one minute, they will not flower. The long night is the important factor.

We have recently been doing considerable research on the effect of nutrition on growth and performance of some flowering plants. Flowering bulbs, such as daffodils, and corms, such as gladiolus, are excellent to work with, because they can be maintained year after year.

Results of a three-year experiment on gladiolus consistently showed that large flowering-sized gladiolus, when grown in an average garden soil, gave better results when no fertilizer was used. In fact, applications of nitrogen produced fewer flowers, shorter spikes, and later blooming. Very small corms and cormels did, however, need additional fertility. It must be pointed out that the soil should be a fairly good garden soil. Sandy soils and ones very low in fertility require some fertilizers, but even then applications should be light.

During the course of the fertilizer trials on both gladiolus and narcissus, it was found that certain fertilizers always increased the amount of fusarium rot. On gladiolus, the disease is commonly called yellows; on daffodils, it is known as basal-rot. In all instances, as the amount of nitrogen was increased, the virulence of the disease increased. There was also differences in the effectiveness of various sources of nitrogen in increasing the rot. All forms of organic nitrogen increased the disease more than inorganic or so-called chemical nitrogens.

Such results led us to investigate the nutrient requirements of these fusarium diseases. These organisms are themselves small plants and require nutrients just as large plants do. They were grown in culture media in flasks, and various elements known to be necessary for plant growth were added or withheld; it was observed that the disease organism responded with an increase in nitrogen.

We also obtained some evidence that high levels of nutrition can increase the virulence of curvularia leaf spot on gladiolus. Certain plants were exposed to the disease. One plant given only water showed no disease, one given N P K was lightly infected; when five times as much N P K was applied, the plant was severely infected, and when twenty-five times as much N P K was used, the disease killed the plant. Thus we may eventually control some of our plant diseases by better use of fertilizers.

Some of the most difficult plant diseases to control are those which live year after year in the soil. The most satisfactory method of control is to breed resistant varieties. In order to test for resistance, we must know the soil temperatures favorable for the disease organism, and so we have specially constructed soil temperature boxes for such studies. Each box has four metal cans for soil, and the temperature is controlled by a water bath. Three daffodil bulbs were planted in each container, three in soil inoculated with the disease, and one in soil uninoculated as a check. The six temperature boxes were run at 45°, 50°, 55°, 60°, 65°, and 70° F. It was found that the disease organism could not function at 45° and 50°, slightly at 55°, but more efficiently at 60° and higher. The results explain why it is very difficult to grow daffodils in our southern states where the soil temperatures are high. The paper-white narcissus, which does grow well in the South, is highly resistant to the fusarium disease.

When large plants, such as roses, are to be tested for resistance to a leaf spot disease, it is difficult to expose many plants at one time because of their size. We now use a floating leaf technique, that is, leaves are removed and placed on cotton or filter paper in petri dishes, and blackspot spores in water are then dropped on each leaf. Such à program makes it possible to test hundreds of plants in a short time as to their susceptibility or resistance to blackspot.

It is generally understood that some dormant plants must be exposed to cold temperature before they will resume growth and produce flowers. This is especially true of most flowering bulbs. The Easter lily shows a remarkable response to preplanting cold storage treatment, and by means of cold storage it is now possible to flower Easter lilies all year.

We have also been interested in cold storage of garden lilies. On October 14, 1951, we received a large shipment of six garden lilies. A sample of each variety was potted up and placed in the greenhouse immediately. About March first, some were in flower, and others were barely starting to show buds. On the same day this lot was planted, other bulbs of the same varieties were stored at 31°, 40°, and 50° F. After six weeks at these temperatures, samples of bulbs were removed and planted in the greenhouse. They bloomed earlier and were of much better quality than those planted without any cold storage.

For the past few years we have been conducting extensive experiments on bulbous iris. Over fifteen thousand bulbs are used each year. Florists had been experiencing considerable trouble with iris, including failure to bloom and blooming too late. It was found that these bulbs needed a short period of high temperature curing immediately after being dug, followed by five weeks storage at 50° F. The high temperature almost eliminated failure to bloom, and the 50° storage speeded up flowering.

Plant breeders sometimes are unable to obtain seeds from plants they are working with, and such sterile plants may completely block a breeding program. Plants which fail to set seeds with their own pollen are called self-sterile; those which refuse to set seeds with pollen from other plants are referred to as cross-sterile.

Self-sterility is common in the Easter lily. Most of the varieties will not set seeds when their own pollen is used, nor do they set seeds when varieties are inter-crossed. Since it was desirable to obtain selfed seeds, we tried many methods to overcome this difficulty of self-sterility. Finally, by using growth regulators, commonly called hormones, we did obtain self-pollinated seeds on the self-sterile Easter lily. The hormone used was naphthalene acetamide. It was impregnated in lanolin; a one percent preparation proved most effective.

The hormone is applied by breaking a petal, where it is attached to the pistil, and smearing the hormone mixture on the wound. This is done when the pollen is applied. The seed set is not heavy; however, in self-sterile lilies, we have never obtained any selfed seed without the hormone.

The hormone treatment has also proved beneficial in making cross-pollinations in other plants. One of these is the lima bean. Plant breeders usually obtain very few seeds from lima bean pollinations. The hormone is scratched in with a needle (only a slight wound being made) at the base of each flower to be pollinated. The pod resulting from the treatment is much larger than the untreated one, and the seed set very much increased. Many of the untreated pollinations do not even set a pod.

In our lily breeding, we have developed several methods to speed up the work and to obtain certain crosses. For instance, we may wish to cross-pollinate two lilies that bloom at different times, such as a late May species with one that flowers in August. To accomplish this we hold the pollen of the early variety until the late variety flowers. The pollen is collected, dried, and placed in small glass vials; the vials are stored in a dessicator at about 50° F. We have kept pollen of some lilies species viable as long as five months.

Since many otherwise normal-appearing lily seeds do not contain embryos and are, therefore, worthless, we always examine all lily seeds before sowing them. The seeds are placed on a glass with a light bulb below and the embryos, if present, are easily seen.

You have probably heard about tetraploid snapdragons, marigolds, and other plants. The word tetraploid refers to the number of chromosomes in a plant. The chromosomes, as you know, are the carriers of the hereditary material from one generation to the next. All living cells in all organisms contain a small round body or nucleus; when a cell divides to make two cells, the nucleus breaks up into chromosomes. Easter lilies contain twenty-four chromosomes. There are twelve types, each cell having two of each. One chromosome of each type was obtained from the maternal plant and one from the paternal plant that

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A British Gardener Looks at Our Gardens

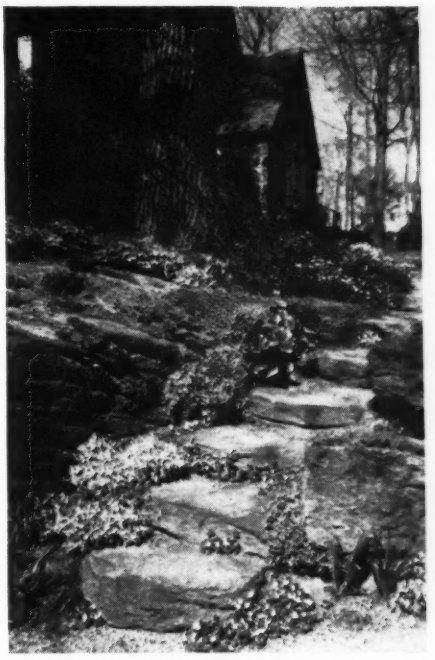
By **Alice H. Cooke**

TWENTY-FIVE years had passed since I had been in America when the ground was not covered with snow, so I was determined that this time I would go in the fall and enjoy again the glorious fall coloring. I went early in September 1952, landing in Boston, and I really did see the trees at their best. Everyone said the autumnal colors were especially brilliant, because of the very hot summer you in the East had experienced.

I covered much of Maine and all of Massachusetts, from Cape Cod and Cape Ann to the Berkshires and the Mohawk Trail, and Hudson River Valley from New York to Albany.

After so many years in Ireland, I was disappointed in the gardens in New England—at least those which I was able to see while motoring. In front of the houses there were lawns and small conifers or evergreen shrubs —some people keeping their shrubs pruned and others letting them grow and shut out the light from the windows. The backyard gardens seemed to be more lawns, flowering shrubs, and a very few odd flowers, but not in beds as we have them here. *Salvia splendens* was planted round the front porches of many dwellings in the suburbs of Boston, making a bright bit of color—but I got tired of only the one flower.

I did not see any gardens, as we think of gardens, till I visited Mrs. Mortimer J. Fox at Mt. Kisco, New York. She has an abundance of flowering shrubs around her house and also in borders stretching down the sloping lawns. Many of the shrubs were then laden with bright berries, and the pieris were simply loaded with buds for spring flowering. There are interesting outcroppings of rocks on her place and down behind the house, where there is a pool in the woods, Mrs. Fox is making a really lovely woodsy garden with all your native wild flowers. Hers was the first vegetable garden I saw, and she also has an herb garden, of which I saw a number later. They are evidently very popular in the States. Here we put our herbs in our herbaceous borders or round the walled-in vegetable gardens. I am inclined to like our way better, as most herbs are not very colorful and are apt to become scraggly.



A group of steps in the extensive rock garden of Harold Epstein at Larchmont, N. Y.

Then I visited Harold Epstein in Larchmont, New York—all his grounds are one large rock or alpine garden, and a beautiful one. His situation is most suitable for such a garden. There are many pockets in the large rock outcroppings for all sorts of choice alpines, dwarf conifers, and all kinds of ericaceous shrubs. The plants looked very happy and reflected the care that is bestowed on them.

Mr. Epstein motored me to Far Hills, New Jersey, to visit the rock garden of Mr. and Mrs. Leonard J. Buck—a really wonderful rock garden. I think it is quite the most natural rock garden I have ever seen and it does have a remarkable selection of plants. It was then well into October and not the best time for garden visiting; but Mrs. Buck showed us colored slides of their plants and shrubs in flower, so I could appreciate how really lovely their garden is in spring. One of the great assets is that they have plenty of room so everything can be planted in masses—and not in twos and threes as most of us over here have to plant.

From Far Hills, Mr. Epstein took me to Gladstone to visit Harold Tubbs and Dr. Ben Blackburn, but as it was

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There are interesting outcroppings of rocks on the home grounds of Mrs. Mortimer J. Fox at Mt. Kisco, N. Y.

WILD FLOWERS

in The New York Botanical Garden - II

By **Joseph Monachino**

In continuation of the writer's previous article (in the May-June issue of this Journal) dealing with the spontaneous flora of the Garden, notes will be presented on a few of the many species in bloom on the grounds during July and August. The brief remarks accompanying the species-names are, in some instances, based on direct personal observations and are of details not recorded in standard manuals. As such, re-examination may indicate some of the characters described to be inconstant. All novel observations are subject to error, until they have been checked many times over. Some specimens display anomalous or unusual features rarely found in other plants. Notes accidentally based on examination of these exceptional individuals, notwithstanding their accuracy and value, do not apply to the species in general. The writer will welcome comments and corrections by other observers of our local flora.

Botanical descriptions serving to identify the species can be had in The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada. If time permits, compare with the descriptions in Fernald's "Eighth Edition Gray." There is now an excellent opportunity to compare two recent authoritative botanical texts on the same subject. Both of these floras are the result of contemporary elaborate studies by eminent botanists, but they contrast greatly, to a degree almost antipodal, in their approach and style.

Alisma Plantago-aquatica in a flooded depression in the low meadow north of The New York Botanical Garden proper, as now delimited, grows together with *A. subcordatum*. The flowers of the two species are conspicuously different when the plants are in fresh condition. This difference is obscured when the specimens are dried for the herbarium, so that it then becomes difficult to distinguish the two. In the form described the petals are colored and larger than in *A. subcordatum*, roseate, with yellow bases, 3.5-4 mm. long; anthers 0.8-1.1 mm. long, styles about 1.3 mm. long. Vouchers for this report are deposited in the Local Herbarium of The New York Botanical Garden (numbers 449 and 450, collected August 9 and 2, 1946). The name *A. Plantago-aquatica* was formerly applied to *A. subcordatum* in America. The venation of the leaves of the water-plantain shows affinity with *Sagittaria*; the blades are not sagittate, the midrib is not raised above.

Peltandra virginica occurs along the Bronx River, in the adjacent ponds, and in other aquatic habitats. Its arrow-shaped leaves should never be confused with those of *Sagittaria*. The venation is completely different. There are no nerves parallel to and approximating the midrib in the blade of the arrow-arum. The lobes are blunter. The base of the petiole has no crosswise diaphrams of tissue clearly seen in the arrowhead. The vernation—or the condition of the leaves before unfolding—is different in the two sagittate leaves. In *Peltandra* one margin of the blade is incoiled and the other margin is wrapped around it, imbricate fashion. In *Sagittaria* both margins are involute, neither overlapping the other. The berries of *Peltandra* contain a tenacious jelly which can be drawn out into microscopically thin threads. These cobweb-slender filaments of gum can be stretched great distances, until they become so fine and light that they remain suspended in the air over the heat of the lamp, as though weightless. They are now visible and now seem to disappear, as the light strikes. The berries can be sprouted in water at home. The young plants that emerge have not the sagittate leaves of the adult.

Rumex Patientia grows together with two other coarse weedy species, *R. obtusifolius* and *R. crispus*. The leaves of the patience-dock are broader than those of the curly-dock and though their margins are crisped, not as strongly as those of the latter. They are not cordate at the base; they are paler and sometimes not as broad as those of the broad-leaved-dock. In bud the three styles are pressed down against the edges of the trigonous ovary. The stigmas are prettily penicillate or finely fringed. The flower has three outer and three larger inner sepals. In fruit the inner sepals, convergent over the achene, are called valves, and their tubercles are called grains. The mature fruit and the structure of the grain are important in critical determinations of *Rumex*.

The patience-dock collected by the writer in the North Meadows on June 22, 1936, was determined in 1953 by a rumex specialist (K. H. Rechinger, fil.) as subspecies *recurvatus*. The subspecific name does not appear in our standard manuals. This determination exemplifies the importance of vouchers in precise botanical studies. The North Meadows are now outside of the Park proper and have been subjected to flood during reconstruction work; consequently, some species have disappeared from the area—as many others have from New York City. Records of these species, if not supported by specimens in the herbarium, can never be verified or reinterpreted by subsequent study.

Polygonum cuspidatum gains a strong foothold by means of its rhizomes. In spring the leafy stems shoot up with amazing rapidity and the plant becomes widely bushy-branched. Introduced from Asia, the Japanese knotweed invades with an overwhelming affront—so rapidly and defiantly, it can almost serve as the prototype of the fiction writer's plant invader from another planet. The stem is unusually red-mottled. The margins of the leaves are revolute before opening, that is, they are rolled outward, a vernation characteristic of the Polygonaceae in general. The undersurface of the blade is at first completely protected by the revolute margins. The petiole is articulate at the base. Below the articulation, abaxially, is a frosted window—an oblong or squarish, minutely-celled, glandular area. There is a good (or evil) stand of a closely related species, *P. sachalinense*, in the North Mead-

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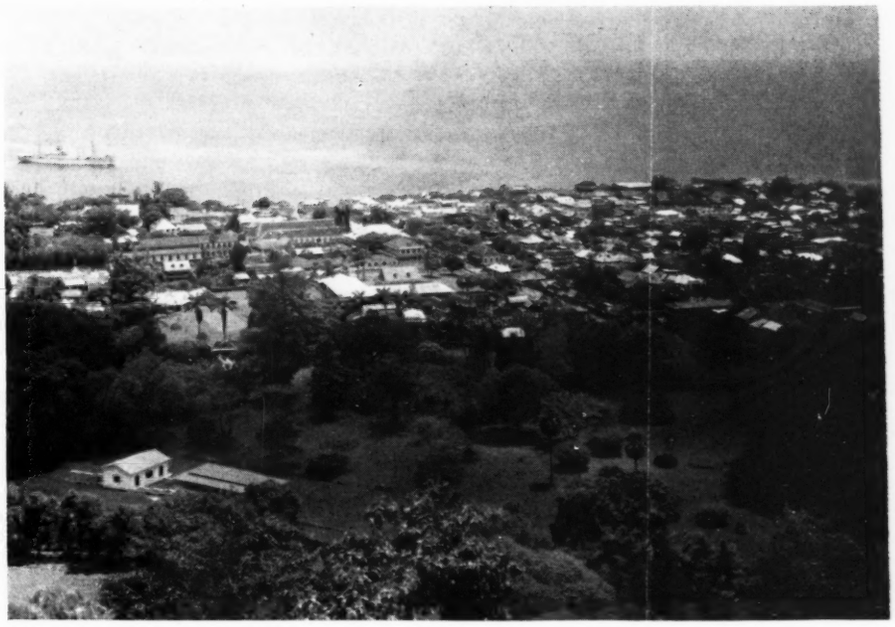
Botanical Gardens *in* *West Indies History*

By Richard A. Howard



The most beautiful garden in the Antilles, that of Dominica, nestles between Morne Bruce and the capital city of Roseau. Specimen trees are spaced on well-kept lawns, and vistas of green add to the enjoyment and relaxation of the tourist.

BOTANICAL gardens are places of beauty where the casual visitor relaxes, the artist catches on canvas the colors of a strange flower, and the home gardener gathers ideas for new plants to be tried in his private garden. But botanical gardens are also practical places where new plants, imported from distant countries, are tried out for hardiness or new varieties are developed with the techniques of plant breeding. Seemingly the botanic garden in all its aspects is divorced from international politics or intrigue; but the botanical gardens of the British Caribbean islands were developed as part of a scheme of intrigue and international competition not so many years ago. It is hard to believe today, in visiting the peaceful gardens from Trinidad to Jamaica, that sea and land battles were fought for control of the fruits or seeds of the plants in these gardens so common in cultivation.

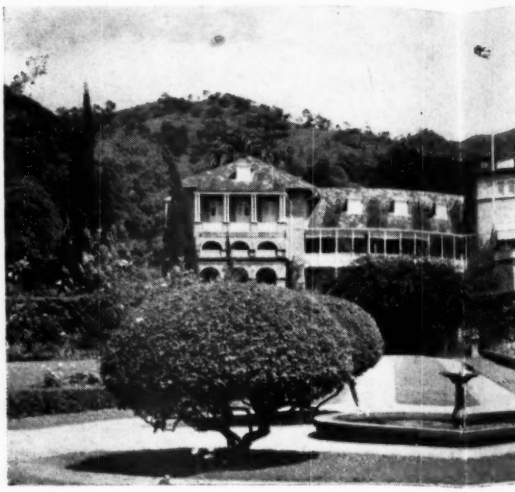
All this took place in the seventeenth and eighteenth centuries. The Dutch controlled the spice islands of the South Seas, as they also controlled the shipping of the world in the seventeenth century. Spices were inflated in price and quantities could be limited as desired to maintain prices and markets. The French and the British were anxious to break the monopoly the Dutch held, and many attempts were made to find the same spices on other islands of the Pacific area, to find substitutes, and ultimately to smuggle viable seeds or whole plants from the Dutch islands. With seeds or plants, new plantations could be established in other areas of the world and new supplies of spices obtained for the markets of Europe. The role of the botanical garden in the West Indies was ultimately to be the propagation of these valuable stocks, once they were obtained.

It had been proven in the sixteenth century that crops from other tropical countries could be grown profitably in the West Indies. Sugar was introduced from the Canary Islands in 1493 and was by the seventeenth century a major crop in the West Indies. Bananas brought to the Caribbean area by Friar Berlanga in 1516, also from the Canary Islands, served as an important source of food for the inhabitants of the Antilles. Coconuts, which grew well in the South Seas, also flourished in the Caribbean area. Thus evidence was available that some tropical plants of the East would grow in the West. So why not others, especially the profitable spices?

In 1730 the now famous Kew Botanical Gardens were established. Hothouses of glass enabled the gardeners to grow in England the exotic tropical plants the British sailors brought back from expeditions ex-

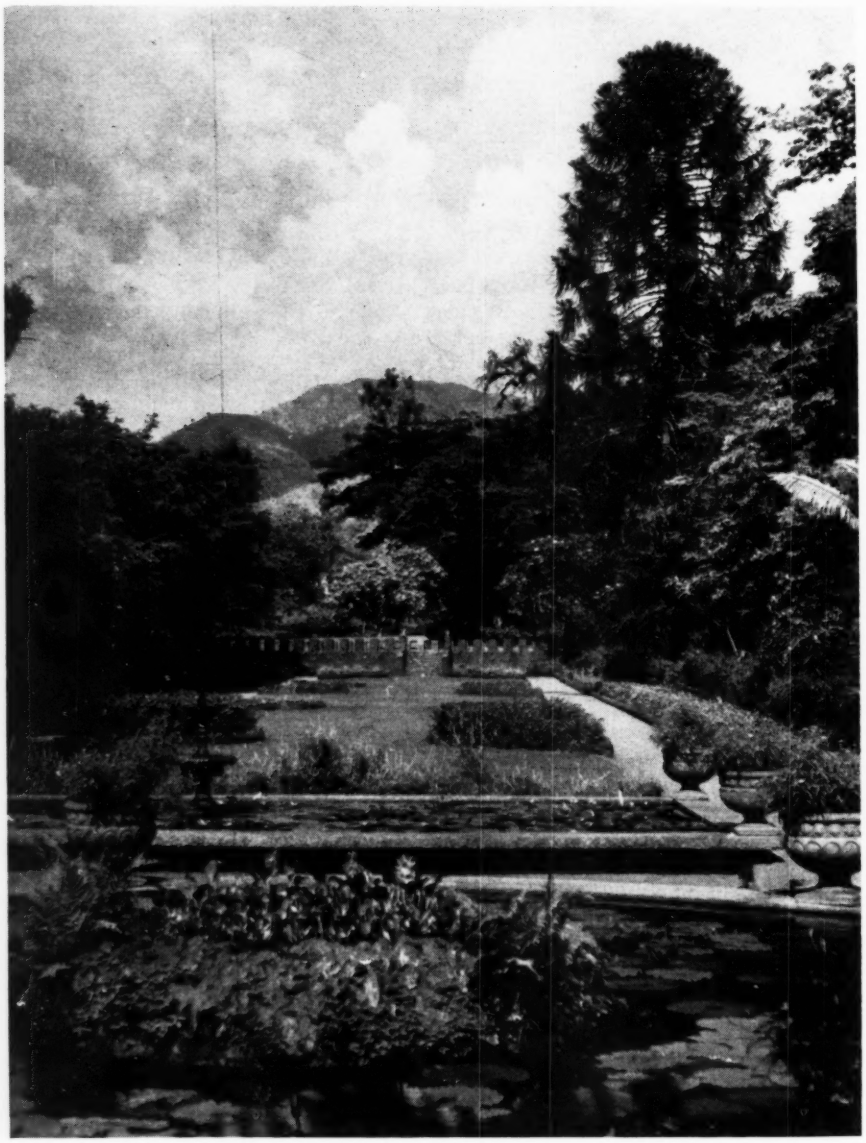
The youngest garden in the Caribbean area is that in Ciudad Trujillo. Here a combination of zoological garden and botanical garden combine to meet the interests of the tourist in an entirely satisfactory manner.

ploring the South Seas. However, a greenhouse was only the first step, and once the seeds and plants were established, these were shipped to the interested colonial planters in the West Indies. Apparently the introduction of valuable crops was not rapid enough to satisfy many people, and so in 1758 the Royal Society of Arts in London announced a series of prizes designed to encourage tropical agriculture and horticulture. The first premium offered was a gold medal for the first person bringing mango seeds to England to be sent to the West Indies for planting. Other plants were soon added to the list, and in 1760 the Royal Society offered prizes for breadfruit, olives, opium, cinnamon, nutmeg, safflower, indigo, cotton, annatto, vanilla, cloves, peppers, mace, camphor, quinine, and various other food and spice plants as well as dye plants and ornamental woods. These prizes were for the introduction of the plants as well as for stated quantities of fruit or products grown from these plants within the West Indies colonies. The explorers were encouraged to obtain, by fair means or foul, seeds and plants of the economically valuable crops of the Dutch-controlled East Indies, and the West Indian planters were encouraged to speed production and so break the Dutch monopoly. The break came around 1770, when both the British and the French were able to wrest from Dutch control seeds and plants of black pepper, cloves and nutmegs, which include mace. All three plants were tried in the West Indies; but as black pepper did not do well in the islands of the Caribbean, interest in this crop was transferred to the Malay Peninsula. Nutmegs and cloves prospered in the Antilles and remain today valuable crops of the islands. Unfortunately, the West Indian planters who received such products were more concerned with personal profit than in sharing their plants by distributing them to other growers and other islands. This problem was solved by establishing government-sponsored nurseries, the botanical gardens, where young plants and seeds would be available to all at moderate prices.

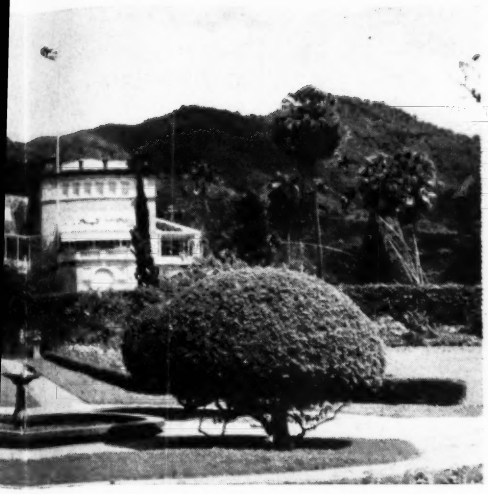


Government House in Port-of-Spain in Trinidad — the ground out the motif of display established in the Garden. Plants in horticultural best on the grounds of t

Pools, terraces, and vistas are featured in the Hope Botanic Garden in Jamaica



The Royal Society of Arts should also receive credit for starting the idea of government botanical gardens. In 1760 the Society suggested that "land should be allotted in the colonies for gardens and nurseries for the making of experiments in raising such rare and useful plants as are not the spontaneous growth of the kingdom or said colonies" and added that "if the colonial legislature would help to establish such gardens the Society would provide proper premiums for plants raised in them." Governor Robert Melville, governor-in-chief of the Windward Islands and a member of the Royal Society, saw one of these announcements and felt such a garden would be for the benefit of the colonies under his direction. He encouraged Dr. George Young, medical officer on St. Vincent, to apply for some lands,



he grounds adjoin the famous Botanic Garden and carry
. Plants introduced by the Garden are displayed at their
ounds of this government building.

and so in 1765 the first botanical garden in the West Indies was established with Dr. Young as its director.

The botanical garden on St. Vincent flourished and under the guidance of Dr. Young and his energetic successors won fame in England by winning many of the prizes offered. To the colonists of Jamaica, however, this successful garden in tiny St. Vincent was only a source of irritation. As Long reports in his History of Jamaica in 1774, "I cannot but consider it as a matter of reproach to the gentlemen of Jamaica that they should have suffered the little colony of St. Vincent to get the start on them, in the execution of so truly laudable and useful a plan." The following year, 1775, a bill was sponsored in the Jamaica House of Assembly by Messrs. East, Wallen, and Hope, now famous names in Jamaican history, to establish in Jamaica, on the plain of Liguanea and near Mr. East's private garden, the first botanic garden on the island. A botanist was sent from Kew to run this garden. With the support of the Kew scientists, this Jamaica garden rivaled and soon surpassed in importance that of St. Vincent.

The rivalry soon gave way to cooperation, not only between the British Gardens but also with the young botanical gardens established by the French at Port-au-Prince in Haiti and at Fort de France on Martinique. The curators of the gardens exchanged plants even during the trying period of warfare between the French and British from 1776 to 1783, when the French captured and occupied the Windward Islands. Both nations continued to import plants during this period and one interesting exchange took place through a sea battle. A French botanical expedition, sailing from Mauritius to Haiti with a boatload of plants, was captured by Captain Marshall of Rodney's squadron. Apparently history records the feat to the credit of Lord Rodney, for Bryan Edwards reports that "with Lord Rodney's approbation, the whole collection was deposited in Mr. East's garden, where they have been cultivated with great assiduity and success." One light touch of history has been neglected in this episode. The ship commanded by Marshall, which made the prize of the French floating greenhouse, was appropriately named the Flora. Many of the plants aboard this French ship were seedlings and could not be accurately identified and so were given numbers. Plant number eleven proved later to be a mango and a good variety. In fact, to this day Mango Number Eleven is a prize mango of Jamaica, the West Indies, and southern Florida.

Once peace was again established in the West Indies, the staffs of the botanical gardens as well as the planters began clamoring for more introductions from the South Pacific. Through the efforts of Sir Joseph Banks, supporting the pleas of the colonists, an expedition commanded by Capt. William Bligh was organized by the

Curved walks, circular beds, and ornate portals characterize the botanic garden in St. Lucia

A lily pool and a model doric temple, enclosing a drinking fountain in the shape of a flower of the yellow allamanda, interrupt a long palm-shaded walk in the botanical garden in St. Vincent

Crown and sailed to the South Seas to obtain the breadfruit plant, which appeared to be a possible solution to the food problem then existing in the colonies. Bligh's first expedition ended in disaster when a mutiny occurred aboard the Bounty. Following Bligh's return to England, a second expedition was formed which was successful. On January 24, 1793, Bligh's ship, the Providence, left five hundred fifty-four plants, including many young breadfruit trees, with the curator of the St. Vincent garden. In the interim between Bligh's two voyages, the French had introduced the breadfruit to their colonial botanical garden on Martinique. But Bligh's voyage introduced, in addition, the Polynesian chestnut, the Polynesian arrowroot, the tappa cloth plant, guavas, nutmegs, teak, mangos, almonds, two kinds of black pepper, and several varieties of coconut, bananas, plantains, and taros. Bligh loaded many plants from the St. Vincent garden to be transported to Kew, and a similar exchange was made in Jamaica.

The success of the two gardens flourishing in the West Indies lead directly and materially to the establishment of the Royal Garden in Port-of-Spain in Trinidad in 1818. When interest in the garden of St. Vincent and Jamaica waned, due to financial difficulties in the colonies and the deaths of many of their active supporters, the most valuable plants were dug and transplanted to Trinidad. The support of the scientists at Kew was also transferred to Trinidad. Thus the glory of the Trinidad garden is second-hand, even though it is the oldest garden in continuous existence in the New World.

A resurgence of interest took place in the 1880's. A plan was formulated, and supported financially by the Crown, to establish a number of gardens throughout the area of the Antilles, to be called botanic stations. Their role was not so much introduction as experimentation, improvement, and propagation. The new gardens were to serve as experimental nurseries, yet as time progressed their contributions were in developing techniques of cultivation, in working with controls for diseases, and in improving varieties by breeding. They became agricultural in interest and departments of agriculture in practice. By 1900 many gardens and botanic stations were functioning. Records of the period show the following established gardens with their date of founding: St. Vincent (1765), Jamaica (1775), Trinidad (1818), Grenada (1886), St. Lucia (1887), Carriacou (1889), Dominica (1891), Antigua (1896), Barbados (1896), St. Kitts (1896), and Tobago (1899).

The tourist who visits the islands of the Caribbean today finds only remnants of the botanical gardens which outgrew themselves. Departments of Agriculture with large staffs of trained scientists, adequate libraries, research facilities, and grounds for experimental plantings carry on the original functions of the smaller botanic garden. The original gardens remain on many islands, some still carrying on important work, but most mainly existing as beauty spots for the person with time to enjoy and appreciate the exotic examples of tropical plants introduced many years ago.

Within the British Islands of the West Indies today, the lovely gardens of St. Vincent and Grenada remain as examples of the serenity of the past. The garden at Trinidad, although well kept, furnishes guides and conducted tours and has lost, to this observer, some of the charm a garden should have. The garden at Carriacou has been abandoned. Those on St. Lucia and Martinique have suffered recently, the former being taken over temporarily for a construction site following the fire which destroyed the capital city, and the latter by the needs of building space within the city of Fort de France. The botanic garden on Dominica, an isolated island from the traveler's point of view, remains as a functional garden in the sense in which all these gardens were established. It is truly one of the most beautiful gardens in the entire Caribbean area. The gardens on Antigua, St. Kitts, and Barbados are no longer functional, having been replaced by departments of agriculture. The original garden in Jamaica was abandoned many years ago, but is today replaced by such show places as the Hope and Castleton Gardens.

On the other islands of the Carribbean, there are gardens to attract the botany-minded tourist. The old botanic garden in Havana is now eclipsed by its younger and more specialized competitor, the Atkins Garden and Research Station, maintained by Harvard University as an arboretum at Soledad near Cienfuegos. The King's Garden, which history reports as flourishing in Port-au-Prince, can no longer be found; but in the eastern half of Hispaniola, the Dominican Government has established a new botanical garden in conjunction with a zoological park in Ciudad Trujillo. Finally, the U. S. Department of Agriculture maintains small gardens and large experiment stations in several spots in Puerto Rico.

For the Younger Generation of Gardeners

THE CATERPILLAR'S COLLAR

By **Edith Farrington Johnston**

Have you ever watched a green sphinx-moth caterpillar as large as your largest finger munching his way through your tomato patch, up one leaf and down another? Have you ever wondered how enough tomato plants ever survive to supply our tables, if many such caterpillars exist?

And have you ever discovered on one of these big blue-green larvae a collar or other adornment that seems to be made of polished white rice-grains standing on end?

The rice-grain ornaments are the answer to your wondering as to how tomato plants survive. They are the coccoons of a small fly, whose young are parasitic, that is, they live on the caterpillars of the sphinx-moth.

Earlier in the season, when the great pale-green "worms" were small and newly hatched, the little black female ichneumon fly, which had been hovering about waiting for the moth-eggs to hatch, pierced many of them with her incredibly long, incredibly fine organ for laying eggs (ovipositor is the correct name for it), not just once, but many times, depositing a tiny egg at each puncture. Often these punctures encircle the baby caterpillar's neck. Sometimes they are placed at random here and there over its back and sides. Occasionally they almost cover the poor larva.

In a few days the eggs hatch into minute footless grubs, which live beneath the caterpillar's skin and feed on its abundant fatty tissues. The caterpillar does not seem to be at all bothered by them. He continues to batten on your tomato or potato foliage. As he grows larger, the damage he does to your plants is enormous.

Now and then, at intervals of a few days, he pauses in his greedy eating long enough to split his outgrown skin and come forth in a new and larger one, without in the least disturbing his unwelcome guests, entrenched in the fatty tissues underneath. He seems entirely unaware of them and continues to eat and grow.

You need not be afraid to pick him up to examine him. Large as he is, he is not able to do you any harm. He will not even try to bite you; he will only thresh violently from side to side to scare you away. The menacing horn on his tail or rear end is only an empty threat—it is hollow and of substance like a very thin finger-nail. Look at him under a small magnifying-glass, and you will find unsuspected beauties of color and marking.

At last, a few days before the caterpillar has grown large enough to stop eating and retire into his pupa-case underground to sleep until he emerges as a moth, the young ichneumon larvae finish with their eating, too. They burrow out to the surface of the caterpillar's skin, where they quickly spin around themselves those shining white silken coccoons so like polished rice-grains. These remain attached to the caterpillar's neck, back, or sides until their period of pupation ends and the new crop of ichneumon flies emerges, all ready to go to work on another generation of tomato-worms.

Although the big tomato-sphinx caterpillars seldom show any discomfort from their parasites, they do not often have sufficient vitality left to enable them to reach their pupal stage. You sometimes see a large fleshy larva creeping about, wearing his collar of white coccoons and apparently mature enough to enter the ground for pupation, but lacking the vigor necessary to begin his tunnel. He crawls around in an aimless dispirited manner, quite different from the galloping energy that animates a healthy larva at larval maturity. If one of these droopy larvae does manage to burrow underground and change into his jug-handled pupal form, he will never come forth as a moth. If you dig up such a pupa, you will find it brittle and empty, with only a bit of chaffy dust instead of the plump young moth. You cannot help feeling sorry for this giant caterpillar with his defiant tail-horn and his gay slashings of white, so overborne by the progeny of a wretched little long-tailed fly!

The green sphinx-moth caterpillar in its various stages, on a tomato plant

This state of mind is not very logical. The caterpillar is one of the deadly enemies of a part of man's food-supply, and the fly which destroys him is, without a doubt, man's friend. But in spite of all logic, no man can regard a fly as his friend.

Nor a worm either, you may say. But the "worm's" final form, the thrilling swift-flighted hawk-moth that whizzes over twilit gardens, thrusting his long coiled tongue into petunias and four-o'clocks and evening primrose, is quite another matter. He is as beautiful, as swift and strong and graceful, as the humming-bird of sunlight hours. The very sound of his passing suggests long peaceful evenings on the front porch in the perfumed summer dusk. Until after midnight, he and his mate will delight you with their swoopings and whirrings and airy hoverings above the nectar-cups. Then they will whirl away, and the mate will deposit her fertile eggs on the undersides of the leaves in your tomato or potato or tobacco patch, where you will never think of looking for them. Soon they will hatch into those ruinous green caterpillars.

Then the small black ichneumon fly will come on the scene, filled with the commendable urge to provide well for her own children at no matter whose cost. And so the cycle is complete. The caterpillar population is held in check, your tomatoes produce a crop, and life goes on.

THE PEONY **(from page 106)**

ticosa is the accepted botanical name.) The name, moutan, means "male scarlet flower," in consequence of the scarlet sort being considered the finest of all, the word, male, referring to propagation by division instead of by seed. It is said to grow wild in the province of Kansu, north of the river Hoang in China. Curiously enough, the wild form has been known only since 1912. References to the garden varieties go back approximately fourteen hundred years. Various Chinese authors, Hungking (536) to Le-She-Chin (1596), extol tree peonies for their beauty and medicinal values.

In 1656, the first embassy of the Dutch East India Company to China started up the river from Canton, and after crossing mountains and traversing lakes and rivers, reached Peking and was received by the Emperor. Upon returning to Holland, an account was made of the trip and an enthusiastic report was made of the tree peonies. Sir Joseph Banks, the eminent horticulturist, read the account and finally obtained a plant in about 1785, which bloomed two or three years later. It was named *P. Moutan Banksii*. The original plant grew until 1842, when it had to be moved because of building operations.

In 1794, another variety, *rosea semi-plena* was imported, followed by *rosea plena* in 1797. Robert Fortune was the first one of record to go into central China to search for plants. In 1846, he brought plants to England. We have no way of knowing whether the Chinese garden tree peonies are the same today as they were in 1846, or whether improved varieties appeared as they did in western gardens.

The history of gardening in Japan is closely interwoven with the history of religion. History records that Buddhism was introduced in that country in about 552, and the Chinese monks brought along many flowering shrubs among which was, no doubt, the tree peony. From then on it was grown extensively, and the culture of it amounted to worship. Although the Chinese employed grafting in the propagation of the tree peony, from about the middle of the eleventh century, it was not known to have been employed by the Japanese until the eighteenth century. The tree peony is grown very extensively in Japan at the present time.

Tree peonies reached America from England early in the nineteenth century. In 1843 one hundred cut blooms of fifteen varieties were exhibited in Massachusetts. The tree peony has been exploited for new varieties—one of the leading exponents being A. P. Saunders—but so far has not enjoyed the popularity among gardeners that the Chinese herbaceous peonies have, principally because of the more difficult cultural problems that have been involved. Recent findings, regarding propagation and simpler and more reliable cultural techniques, should remove the former objections to growing tree peonies, and they are bound to increase in popularity. Who can say that, eventually, the tree peony will not be held in just as high esteem as the herbaceous peony is today?

GRANDMOTHER'S GARDEN **(from page 107)**

In the meantime, other members of the club had ordered and planted seeds in greenhouses. Then, too, everyone was experimenting with herb cookery —the husbands, bless their souls, being the guinea pigs. Recipes, yellowed with age, were pulled from forgotten corners. These were tested, even to marigold custard flavored with rose water, for the herb cook book about to be published.

After a wait of six weeks, and no more herbs, I was really worried. A club member, hearing of my plight, asked if I would like to look over her garden. "I think I may have a few herbs," she said, "but they are old and may not be any good." She saved my life (I never did get the rest of my order) for that started me on a successful tour of the town. In baggy slacks and floppy hat, I begged herbs shamelessly. I am sure I deserved the name my family pinned on me—"The Old Herb Woman." And that was how I found out "Grandma" had done a bang-up job of planting, not only her herbs but her wonderful spirit of friendliness.

After the plants and seeds were in, peat moss was spread—then water, water, water, every evening without fail. "Old Mister Sun" did the rest.

One morning, a day or two before the show, I looked out of my window to see the Clarence Garden Club, complete with husbands, unloading plants raised in the various other gardens, potting them for sale, filling any bare spaces in the show garden, weeding, clipping, and digging like beavers. Huge marigold plants were brought by the dozens, to make the yard, itself, a miracle of beauty. The crowning touch was achieved when one grand guy stripped his own garden of mammoth long-stemmed sunflowers. He "planted" these in jars, sunk in the ground, among my own sunflowers which did not bloom until a week later.

Herbs for the kitchen, medicinal and fragrant herbs, herbs of history, tall ones and creeping varieties were there in the garden, outlined by the red sand of the walks—the creeping thyme refused to creep more than a few inches. Over sixty different herbs were labeled with common and botanical names; a legend or two was on each card, a source of much interest.

In early days it was believed that certain herbs, by their outward appearance, gave signs as to the diseases they would cure. Garlic, with hollow stem, was good for the windpipe. Lungwort and sage, with lung-shaped leaves, were used for lung trouble, while saffron would relieve jaundice because of its yellow color. This idea (called the "Doctrine of Signatures") was started in 1492, by a Swiss physician and chemist, who called himself Paracelsus. It spread over Europe and finally this country in 1872. There are still people who believe in this theory, and perhaps it is not all hocus-pocus, as today certain herbs are used in medicine.

Parsley cured baldness, if seeds were sprinkled over the head three nights in a year or, in case of a slip-up, onion juice could be used, for it "bringeth the haire againe speedily." Parsley was also used as a wreath on the head of a dinner guest to dis-

courage intoxication, and mothers told their children that babies were found in the parsley bed.

A drink of French thyme would surely cure a nightmare, while the English variety would give a tired soldier strength, if walked upon. Flowers of thyme, gathered "where the fairies lived" and put on the eyelids, would enable the person to see the little folk.

To produce a handsome crop of whiskers, the bark of southernwood had to be fried with other ingredients and the paste applied to the face once a day.

The chlorophyll of that day was rosemary and used in the bath would make the person young again. It was always used in a bride's bouquet to insure her happiness.

I wonder whether the expression "an apple a day will keep the doctor away" originated from the fact that apples and caraway seeds were served after a heavy meal, in old England, to prevent indigestion.

Cumin and dill were very valuable in Bible times, used to pay tithes. Cumin was a sign of greed and was the name given to Marcus Aurelius, known for his lust.

The sesame seed was believed to have magic powers and thus the "Open Sesame!" of the story of Ali Baba and the Forty Thieves. Today we have the magic flavor of those good sesame rolls.

In England, it was easy for a woman to reduce—a basil leaf, slipped under a fattening dish, would prevent a woman from touching it.

Just to chew marjoram would relieve a toothache, or brewed for tea and swallowed by a person of sad mood, marjoram was bound to make him joyful again.

Perhaps we do not believe in these old legends or in the medicinal qualities of herbs, but we cannot help loving their fragrance and flavor. We should do well to put sprays of lavender between our own linens, use spicy southernwood instead of the offensive moth ball, sew a pillow of mint or relax in a bath of thyme. And when it comes to the flavoring of food, I am sure that there is still a thing or two we could learn from "Grandma," who so thoughtfully left us her garden of herbs.

HORTICULTURAL SCIENCE (from page 114)

furnished the pollen. A lily with twenty-four chromosomes is called a diploid, the prefix *di* meaning two of each kind of chromosome. If something occurs to cause the chromosome number of a lily to become doubled, the new plant would have 2 x 24 chromosomes, or forty-eight. It would then be called a tetraploid, because it would have four of each type of chromosome. The prefix *tetra* means four.

Tetraploids have occurred spontaneously in some plants, but it is only recently that we have been able to make them to order. Several drugs will cause doubling of the chromosome number, the most effective one being colchicine.

When a cell divides to make two cells, each chromosome splits longitudinally just as if it had a zipper. The two halves separate from one another, move apart to opposite sides of the cell, and a cell wall is formed between them. If a dividing cell contains the right amount of colchicine, the chromosomes split; but as the sister halves are unable to move apart, two cells are not formed. However, since each chromosome has split, the cell now contains twice as many chromosomes as it did before.

Lily tetraploids are made by soaking lily scales in colchicine for a few hours. Lily scales, when detached from the mother bulb form small bulblets, and if colchicine is present in the scale, some of these bulblets will be tetraploid. When a tetraploid bulblet has been obtained, it and all propagation from it will remain tetraploid.

We have made other flowers into tetraploids, including snapdragons, by treating very young seedlings with a .2% colchicine solution. The colchicine was applied at the tips of the young seedling and some of the branches developing from that area proved to be tetraploid. The tetraploid snapdragons have sturdier stems and larger flowers.

Poinsettia tetraploids appear to hold their leaves much better than diploids, but the flower bracts are almost the same size. The true flowers that are borne in the center of the red bracts are larger on the tetraploids than on the diploids. These true flowers, however, are so inconspicuous that they do not attract much attention. When seed pods are formed, they are larger on the tetraploid than on the diploid.

The value of chromosome doubling in horticultural breeding is becoming more apparent as research workers develop tetraploids in fruits and vegetables. There are many problems yet to be solved before we can take full advantage of this new technique, but the future looks promising.

Some of our finest fruits are already tetraploid, having become so probably by spontaneous doubling of the chromosomes at some time during their evolution. We now have a tetraploid apple at Beltsville, made by treating the variety McIntosh with colchicine. It is quite obvious that there is an increase in size as a result of doubling the chromosome number.

By utilizing some of the techniques I have mentioned, we have been developing quite a few new plants. The West Coast lily, *Lilium Washingtonianum,* which grows at the foot of Mount Shasta in California, is a lovely lily with a spicy fragrance and attractive spotting of the petals. Another attractive lily grows a few hundred miles away from *L. Washingtonianum;* it is named *L. columbianum,* Both of these lilies have consistently proved hard to grow, and we have developed hybrids between them, which we hope will be more amenable to culture. One of these hybrids is very vigorous and most attractive. A sister hybrid, from the same seed pod, is very different but also very worthwhile. Unfortunately, both these hybrids are proving difficult to grow.

Another group of lily hybrids contains some forms that are easy to grow and should soon be available to gardeners. One parent is the lovely *L. auratum,* commonly called the goldband lily. The other parent is *L. speciosum,* considered by many as the most beautiful of all lilies. The cross between these two lilies has given a wide range of beautiful hybrids, that combine characters from both parents. By crossing these hybrids back to their parents, we have obtained a group of lilies that are easy to grow, very vigorous, and destined to replace many of our present-day varieties.

The above article is based on the lecture Dr. Emsweller gave in the Downtree Lecture Series of The New York Botanical Garden.—Editor.

BRITISH GARDENER (from page 115)

getting dark, we had only enough time to see their Japanese garden and their propagating beds.

With Mrs. Fox, I spent a half day at the Boyce Thompson Institute for Plant Research at Yonkers, New York, and I was most interested in their seed experiments. Dr. P. W. Zimmerman and Dr. Nora E. Pfeiffer were very kind in showing me about. Up till then I had been much more interested in cuttings than in seeds, because I had had much better success with cuttings. I realize now that this is due to the fact that I do not know enough about seeds. Since returning home, I have been reading some of their publications and am now working with seeds. My sun-porch is filled with seed pans, closed plastic containers, petri dishes, and bell jars.

I also spent a most interesting afternoon at The New York Botanical Garden, where I saw all the fine outdoor chrysanthemums, which were excellently marked, and the very attractive herb garden. I was sorry not to have seen the Thompson Memorial Rock Garden when there was color in it, for I think it is much better and much more naturally designed than most botanical rock gardens. It stretches naturally along the stream and is not a collection of rocks erected only to hold plants.

Miss Hall, the Librarian, was most helpful in showing me things and in answering all my questions. I consider myself very fortunate to have been there for a meeting of the Advisory Council and to have heard T. H. Everett, the Horticulturist, tell about his trip to Britain last summer and the plants he brought back with him. It was extremely interesting to me, as a British subject, to learn what plants he considered worth taking back with him. I was amazed to learn that most of them did not already grow in the States. I was especially interested to hear him say that the escallonias and olearias he would send to California; he did not believe they would survive a winter in New York. I grow them both in my garden as windbreaks, and my garden runs down to the Irish Sea and is exposed to every wind that blows. I do not get much frost, but the east wind is very deadly.

Farther south on my travels, I was greatly impressed with the pyracanthas and the very large crops of berries that they all had produced—so much better than the pyracanthas over here. In Georgia I saw Spanish moss for the first time, and I thought the grass on Sea Island as green as any I have ever seen in Ireland—but the sprinklers did seem to be running most of the time. I love the woods everywhere in the States—I miss them here very much—and I felt the fall coloring was well worth the trip.

I was disappointed not to see more herbaceous borders and beds of annuals; there appear to be relatively few flower beds as we think of them. Your large gardens are wonderful, but the small middle-class man, who lives on the suburban street, does not seem in your country to be the gardener that he is in this country. Here the small garden is a mass of flowers all summer, and the owner works in it the long summer evenings. Of course, we do not suffer from the intense burning heat that you do.

I only wish I could tear myself away from my own garden in the spring or early summer so as to see your gardens at their best, but what gardener likes to leave his—or her—garden at the best time of the year?

WILD FLOWERS (from page 116)

ows. The plants examined by the writer were less bamboo-like in habit (*P. cuspidatum* has been called Mexican bamboo), more leafy or dock-like in appearance, the leaves broader, more cordate at the base, not as satiny above, the veins on the underside of the blades short-hairy, not merely scabridulous. The stem was striate, green. It had several windows (about seven) of different sizes around the node, not merely one as *P. cuspidatum*. The sacaline is spelled *P. sacchalinense* in the Flora, and with a single *c* by Fernald and in the original description.

Silene stellata grows in the woods north of the Museum Building. The leaves appear in whorls of four, but actually they are opposite with the upper pair of the set very close and at right angles to the lower at the swollen joint of the stem. The base of the petioles of the opposite leaves are connected by a membrane. The blades are softly pubescent, faintly three-nerved at the base. Because the white petals are fimbriately lobed and crownless, the species has been placed in the Rafinesque genus *Evactoma*. The variety of starry campion common in the vicinity of New York City is that with closely crisp-puberulent inflorescence, pedicel, and calyx, named var. *scabrella*. The variety is not noticed by Fernald. For its description (not distribution) see the Flora.

Geranium nepalense var. *Thunbergii* is found on the east bank of the Bronx River at the foot of the North Bridge (now replacing the old Boulder Bridge) and elsewhere. The rhizome is short, the stem decumbent, about one meter long, rooting at the nodes; pedicels with slender gland-tipped hairs; flowers usually two to each peduncle, whitish, the petals with lavender veins, about 8 mm. long, 4.5 mm. broad, rounded at the apex; anthers lavender; seeds black, very minutely reticulate. Specimens of this species deposited in the Herbarium of The New York Botanical Garden were collected on the grounds by M. E. Eaton on August 8, 1916, Arthur Hollick on August 15, 1927, and Charles Gilly on July 25, 1940. All these were erroneously identified as the Siberian geranium and served to characterize this species in the Flora. Thunberg's geranium would never be confused with the latter, which is not very rare in the local area, if the two are seen growing. A section of fresh stem alone could suffice to separate them, for Thunberg's will root at the nodes when placed in water, whereas the Siberian species will not. The peduncle is habitually two-flowered in *G. nepalense* var. *Thunbergii* (see illustration in the Flora), single-flowered in the other, the pedicel is glandular, not so in the Siberian, the flowers are lighter colored and larger (only about 3.5 mm. long and 2.5 mm. broad in the Siberian, seen at Inwood Park, Southfields, etc.) An article on *G. nepalense* var. *Thunbergii* appeared in 1945 in "Rhodora." This species is described in Fernald's "Eighth Edition Gray." The Garden plant has not been checked with Fernald's material, and the identity of the species has not been definitely ascertained.

BOOK REVIEWS

PERIOD FLOWER ARRANGEMENT. Margaret Fairbanks Marcus. 256 pages, illustrated, indexed; modern adaptations selected or arranged by Mrs. Anson Howe Smith. M. Barrows, New York. 1952. $10.

This glorious book is a rich mine of brilliant scholarship and beautiful, exciting arrangements of flowers and all their kindred: leaves, fruits, and branches. It opens a vista of many worlds of flowery treatment, and then resolves their creativeness very wisely, for our use.

The scheme is historical. Starting with ancient Egypt, the chapters proceed through fourteen well-known periods of art to the twentieth century.

There is a long, fascinating, alphabetical list of plant material for each period, culled from all forms of creativeness. In addition, containers are listed, giving shapes and the stuff they were made of, in each age; and, where appropriate, as, for instance in the Gothic Period, a list of the symbolic meaning of flowers and herbs is supplied. Not content with this, ideas for flower show classes and suggestions for further reading are to be found at the end of each chapter.

What more could one ask? Delightfully, much, much more is given. The illustrations are innumerable. Some are in color; the great majority in a most telling black and white, marvelously placed on the page, with a sure sense of scale. They include paintings, prints, reproductions of reliefs, sculpture, porcelain, pottery, fabrics and silver, for Mrs. Marcus very rightly feels that one should be steeped in all phases of the art of a period before attempting to recreate its spirit in flowers.

There is no list of illustrations, which would indeed have been lengthy and was, perhaps for that reason, omitted, but a good index and glossary can be found at the back.

The text is like a flowering branch, clear and well arranged, but bursting with a bud of ideas on every line. Let me quote, p. 112, one sentence: "The Japanese feel that the worst sin of the arranger is trying to be artistic, or allowing his own personality, skill or ingeniousness to overshadow the flowers." Amen!

FANNY WICKES PARSONS
New York, N. Y.

PAGEANT OF THE ROSE. Jean Gordon. 232 pages, illustrated, indexed. Studio-Crowell, New York. 1953. $5.

This is an extraordinary compendium of rose lore and information, a handbook which should be on the desk of the rose lover interested in the literary and artistic background and associations of the rose, its legends, symbolism, and general significance throughout the ages. It is encyclopedic in its range and detail with its separate chapters on legend, romance, art, heraldry, etc. In addition, it is a voluminous anthology of rose references and rose literature. In the abundance of its information, it also includes interesting summaries and descriptions of important old and new rose gardens of the world.

A particularly interesting chapter is that on rose symbolism and mysticism. This is added out of the fullness of the generosity of the author, who undoubtedly spent many years and examined many sources of the information which is often necessarily set forth briefly but with sufficient detail to encourage the inquirer to examine the books from which the references were obtained.

The facts are so many and the references so manifold and unexpected that it was, of course, impossible to coordinate the book as a unit. The references to the same subject are sometimes not consolidated in the same chapter. But the voluminous references and surprising detail can best be appreciated by reading the chapters as separate units. One should read only a few chapters at one sitting. Its usefulness as a reference book is greatly aided by the excellent and elaborate index. Under the general heading, "the medicinal uses of the rose," for example, thirty separate references are included.

A supplementary, and most delightful and engaging, feature of the book is its hundred illustrations and explanatory text, with their fascinating comments. They add to the general text a panorama of the rose.

EDWIN DE T. BECHTEL
Mt. Kisco, N. Y.

THE PERMANENT GARDEN. Norman Taylor. 128 pages, illustrated, indexed. D. Van Nostrand, New York. 1953. $2.

COLOR IN THE GARDEN. Norman Taylor. 118 pages, six plans, index. D. Van Nostrand, New York. 1953. $2.

Thousands of dollars are spent annually for trees, shrubs, perennials, and annuals to provide color and to make small home grounds more attractive. As we drive through suburban areas particularly, we are aware of vast sums of money having been spent not recklessly perhaps, but often not to best advantage. Those who are moving out to a place where they can have a garden are hungry to learn the know-how of selecting and planting material which will be most suitable for their particular property and give them the greatest value for their money, I judge that the author of these very neat little books on gardening has written with every intention of helpfulness, this work being based on many years of horticultural experience and writing by which he is accepted as an authority. In the pages of these two volumes are quantities of excellent suggestions—many of which would not be readily found in other gardening literature. For these we can be grateful.

Unfortunately, most of the subject-matter is detailed information on plant material: shrubs and trees in THE PERMANENT GARDEN,—shrubs, trees, perennials and annuals in COLOR IN THE GARDEN. Although tastes vary greatly, and selections are supposed to be of help to amateurs confronted with frightfully long lists distributed by the trade, these very limited selections are certainly questionable when considering adaptability for small home grounds where mature size, quality, and clean characteristics are so very important. Recommended shrubs leave one wary after he encounters flowering currant (*Ribes sanguineum*) and spiraea Anthony Waterer described as two of the "showiest shrubs in cultivation." Suggested perennials include many which are far from being aristocrats, and somehow the list of annuals omits most of the varieties which have been rated highest by judges all across the country within the last five or ten years.

Recommending use of fast-growing and short-lived trees and shrubs to fill in until more permanent plants can be established and pleached trees for formal vistas seems particularly unsound advice for the amateur gardener, and surely the single-color-garden approach is awkward where restricted space is such a paramount issue for the average small home owner. How he could use these one-color garden suggestions to help plan a single border in which he must grow all his flowers is problematical. There is conspicuous lack of information on combining plants of any kind in groups either for best effect, because of common requirements, or because of ecological relationship. Property development is discussed with hardly an allusion to plantings which may exist or be planned on adjoining property or along the same street. Planting barriers and trees which will stretch their branches way over a neighbor's property cannot just be arranged without regard for the rights and desires of others, nor may street trees usually be selected and planted irrespective of major planting on the same street.

It is indeed disconcerting to be confronted with a set of attractive books for which the need is so great and to find them falling so far short of their mark.

HOWARD W. SWIFT
New York City

THE TROPICAL RAIN FOREST. P. W. Richards. 450 pages, illustrated, indexed. Cambridge University Press, New York. 1952. $12.50.

With the words, "A short definition, however accurate, will give but a poor idea of what a tropical rain forest is . . .," the author judiciously avoids a neatly-framed definition of this complex type of vegetation. Rather, he begins with an introductory chapter in which its chief characteristics are described in general terms; then, in the following six parts which comprise the main body of the book, he fills in the more minute details.

The subject is viewed from an ecological standpoint and it is treated as comprehensively as the available data permit. However, the reader soon discovers how very little, relatively, is known of the ecology in this vast forest which occupies about half of the world's forested area. The author makes full use of the published and unpublished observations of other workers, and the list of references presented is a distinct contribution in itself. But this is much more than a compilation, for Richards draws heavily upon his own studies in the rain forests of Malaysia, South America, and Africa. The body is especially well illustrated with numerous photographs, profile sketches, charts, and graphs. These combined with the bibliography, a general index, and an index to the plants mentioned in the text make this an extremely useful reference work.

One of the most interesting subjects treated is that of regeneration of vegetation in denuded areas of the tropical rain forest. It is with some relief that the interested reader learns that, given adequate protection over very long periods of time, the primary rain forest apparently will re-establish itself. It is also remarkable how very similar these secondary successions are in physiognomy.

In the preface the author writes, "In every chapter I have tried to point out the

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chief gaps in present knowledge and to suggest lines for future work. No better prospect for my work can be wished than that it may soon become out of date." Certainly, one of the most important contributions made by the writer is his frequent references to a host of problems in these forests demanding solution. If one may judge by the number of existent "gaps," this book will long be a classic in its field.

RICHARD S. COWAN

PLANT HUNTER IN MANIPUR. F. Kingdon-Ward. 254 pages, illustrations and maps; indexed. British Book Centre, New York. (Printed in Great Britain.) 1953. $3.25.

Kingdon-Ward describes his book as "a plain tale of plant hunting in the hills." More accurately it can be described as the adventures of a plant hunter, for the experiences of this expedition in pursuit of new plants really spell adventure. Even those who are not botanically minded will find the book enjoyable reading, as it is a vivid and colorful presentation of all the facets of nature and life in this remote part of the Asiatic world on the border of India and Burma. In fact, one many times can feel that he is an invisible third party on the trek. Adding further to the enjoyment of the book is the author's typically informal literary style, which immediately puts one at his ease.

To some the appendix of seventeen pages may prove as interesting as the general text for here is found a geographical history of the region and of its climate, with mention of the most noteworthy plant life. It proves to be a brief, yet complete summary of the exploration.

ROBERT J. HANSEN
Assistant Director
University of Washington Arboretum

THE STORY OF TREES. Ferdinand C. Lane. 384 pages, illustrated, indexed. Doubleday, Garden City, N. Y. 1952. $5.

There has been a need for this book for a long time, a book from which the average person can learn about trees without technical descriptions and details. The facts are presented in an interesting style; the reader doesn't realize it is science, economics, and history he is pursuing. There is good balance in the various phases of the subject, and a very good index is included.

This reviewer feels it should be the duty of every person to read this book in order that all may realize that not only our standard of living, but our very existence on this earth depends upon the care we give our forests.

There are a few minor errors which in no way detract from this excellent edition. For instance, (p. 90), "the red bud is one of our finest timber trees." This will be news to the lumbermen and foresters. It is usually a small ornamental tree which seldom attains timber size. Also (p. 253), "The peak of lumber production in the U.S. seems to have been reached in 1909 when 44 *billion* (not million) board feet were carved from our forests." The picture (opposite p. 256) labelled "Ponderosa Pine in the Nez Perce National *Park* should be National *Forest.* (There is a big difference.) On page 365 (line 6 and 7) "from four kilograms of *wood* a gallon of gasoline can be extracted" should read four kilograms of *coal.* No gasoline is extracted from wood.

The photographs are excellent but one wonders why pictures of a white pine, a longleaf pine, and a Douglas-fir are not included. They should have been represented, for no trees have been a bigger factor in the development of our country.

R. R. FENSKA
The F. A. Bartlett Tree Expert Co.
White Plains, N. Y.

OUR AMAZING BIRDS. Robert S. Lemmon. 239 pages, 102 paintings in black and white by Don R. Eckelberry. Doubleday, Garden City, N. Y. 1952. $3.95.

The author made a careful selection of one hundred and two species so that the book would include some of the birds of town, garden, farm, and woodland, as well as the open ocean, sand dunes, swamps, and cliffs. Though the experienced field observer may not find much in the text that is new, the approach is different, and he will probably enjoy leafing through its pages as much as the tyro. It will appeal to a wide variety of readers, for it is a non-technical book which includes statements on the range, feeding habits, nesting sites and materials, together with an oddity or two concerning the bird, all skillfully woven into a one or two-page brief biography of the species.

There is a delightful sub-heading to the title for each section, and the road-runner becomes the "fantastic sprinter of the desert"; the ruby — crowned kinglet — "the mighty atom of our songbirds"; whip-poor-will—"the bird with the non-stop voice"; hooded merganser — "handsome aristocrat and perfect parent"; scissor-tailed flycatcher —"the sky is its trapeze."

The book is beautifully illustrated by Don Eckelberry. The reader is brought so close to some of the species, by the artist, that he can feel the roll of the waves beneath the outstretched wings of the albatross; can sense the alertness of the kingfisher guarding its nest; can feel the air vibrate to the wing-beat of the drumming grouse; can relive the occasion of his own visit to the nest of a barn owl. OUR AMAZING BIRDS is both charmingly written and handsomely illustrated, well-deserving of a place on one's natural history library shelf.

DAVID FABLES
Biology Department
Union Junior College

CAMELLIAS AND COMMON SENSE. Claude Chidamian. 124 pages, drawings by Shirlea Hatcher; bibliography, index. Garden City Books, New York. 1952. $4.

CAMELLIAS AND COMMON SENSE is essentially a guide for the amateur camellia grower. Its easy style brings a wealth of knowledge to the reader in its well-organized pages. The use of line drawings to illustrate pertinent points adds much to the reference value of the book for the amateur. The twelve color plates contribute little to the book; they are of varieties commonly illustrated in commercial catalogues and seem to the reviewer to serve little purpose.

In building up the theme, the author first describes the natural environment of the camellia and then points out ways and means of duplicating it in the garden. He has skillfully avoided over-emphasizing one phase of camellia lore at the expense of another. The chapter pertaining to camellia usage is especially valuable to the home owner.

This book certainly is worth owning for it attacks the problems confronting those who grow camellias in a forthright manner. It makes no attempt to solve all of the problems, but does approach those that it is concerned with logically. One can recognize the California viewpoint from time to time, but it does not predominate throughout the book.

IRA S. NELSON
Prof. of Horticulture
Southwestern Louisiana Institute

TREES AND SHRUBS OF THE KRUGER NATIONAL PARK. L. E. W. Codd. 192 pages, illustrated, indexed. Botanical Survey Memoir No. 26. Union of South Africa, Dept. of Agriculture. 1951. $1.25.

Founded in 1898 as a game preserve by President Paulus Kruger, the "Old Lion of the Transvaal," and made property of the Union of South Africa in 1926, Kruger National Park is in northeast Transvaal and comprises five vegetative regions in the low veld (five hundred to two thousand feet) with variation in rain, temperature, and terrain. It has several tourist camps and great recesses of primitive forests, where hundreds of thousands of wild beasts roam.

Dr. Codd's handbook briefly treats two hundred fifty-eight out of the one hundred twenty trees, one hundred sixty-five shrubs, and thirty-six woody climbers reported for the park, and also touches on the exotic plantings. It is profusely illustrated by photos, line drawings, and colored plates.

The photos help to characterize the tree habit and habitat (undivided attention to the vegetation is sometimes distracted by a head-on view of an elephant or lion). The general distribution of the species, indexes to the scientific and vernacular names, a map and a chapter on the vegetation of the Park are presented.

This authoritative guide was prepared under scientific sponsorship by a botanist best fitted for the job. All the species mentioned are represented by annotated herbarium specimens. The nomenclature and interpretation follow the most recent taxonomic studies. For instance, Mopane, the African *Copaifera* is corrected to *Colophosperum*, following the 1949 revision by Leónard. *Fagara humilis* and *Commiphora neglecta*, first described in 1951, and species of *Homalium* and *Acokanthera*, still unnamed, are presented; the spelling *Rauvolfia* is used; the possible distinction between *Manilkara* and *Mimusops* and the probable conspecifity of *Strophanthus grandiflorus* with *S. Petersianus* are indicated, the latter being in keeping with the reviewer's own conclusions in his monographic revision of the genus *Strophanthus*.

Careful attention is given to the vernacular names, although some are difficult for the overseas reader to understand. The present reviewer, who has for a long time studied the Sapotaceae and Apocynaceae just now learned that the groups of his choice or lot are the "Stamvrug and Moepel Family" and the "Amatungula Family." Perhaps his embarrassment can be matched by yours, if you do not offhand recognize the family names "Dubbeltjie," "Pendoring," and "Spekboom." But these add a local flavor, and it is wished that more of them were translated, as is done for "Soobapeeri" (*Clausena anisata*, of the Rutaceae): "stinks so that the hyena would not come near it." The etymology of many generic names, and the economic or medicinal uses of species, are given. The important drug principle contained in the seeds of *Strophanthus* is called alkaloids in error; both strophanthine, long known as a heart stimulant, and sarmentogenin, recently studied as a precursor of cortisone, are glucosides.

By thumbing through Dr. Codd's handy-sized guide, an amateur can score a high percentage of identification of the trees and shrubs in the Park. In addition, the species are numbered in the text and corresponding numbers will be placed on conspicuous trees along roads and in rest camps. The descriptions and comments are interesting. The tree fuchsia (*Schotia*, Caesalpinaceae) is said to have "flowers so well supplied with nectar that the tree weeps." The mimosaceaous shrub *Dichrostachys* has "pendulous, fluffy flower-heads, mauve-pink at the upper, thicker end (the female flowers) and yellowish below (the male flowers)." The arrangement is so because the spikes are nodding, for the staminate portion is at the apical end of the inflorescence. The lower surface of the leaves of *Combretum imberbe* are seen under a hand-lense to be "densely covered with minute rounded scales like miniature sequins of silver and gold." Although this is a characteristic species of the Park, there is not a single herbarium specimen of it in The New York Botanical Garden, which further indicates how profitable a trip to Kruger would be even to a botanist.

This reviewer, for one, hopes some day to pay a visit to the Park in Transvaal and see the baobab and the impala lily. He also awaits the realization of the contemplated "more comprehensive and scientific account of the entire vegetation," which will supplement but not supplant the present inspiring introduction to the trees and shrubs of the Kruger National Park.

JOSEPH MONACHINO

400 PLANTS OF SOUTH FLORIDA. Julia F. Morton and R. Bruce Ledin. 134 pages, 24 full-page drawings by Frank D. Venning; indexed. Text House, Coral Gables, Fla. 1952. $3.50.

The highlight of this book is accuracy—the descriptions are accurate, and the illustrations are both accurate and lovely. However, the descriptions are somewhat brief. As the book is intended for the gardener rather than the botanist, it seems that a little enthusiasm here and there would dispel the dullness—in fact, just a touch of Reginald Farrar would be welcome.

A great drawback is the lack of keys—such as Mary Franklin Barrett's LEAF KEY TO FLORIDA BROAD-LEAVED TREES. Lacking such a key, it is, nevertheless, still possible to identify from this book a plant without previous knowledge of its scientific name.

This reviewer also feels that listing plants alphabetically instead of grouping them in some manner is a disadvantage.

The paper and printing are very good, and the entire appearance of the book pleasing.

For anyone who knows little of the flora of South Florida and is eager to learn, this should prove a valuable book.

EVANS D. RUSSELL
Sebring, Florida

FLORA OF WEST VIRGINIA. Part I. P. D. Strausbaugh and Earl L. Core. 273 pages, illustrated. West Virginia University Bulletin, Morgantown, W. Va. 1952. $1.

It is an excellent book, through which any intelligent person interested in plants can, without difficulty, identify them. Like a long reception line, the book starts with the distinguished ferns and so-called fern allies and ends with the gay young orchids —"the last works of God in the plant world," as Dr. Jeffrey used to say in his Harvard lectures.

Although I did not test all the keys to see how well they worked, they are couched in such simple language that with the very fine line drawings that accompany them and the detailed descriptions, often on opposite pages, they make "running down a plant" easily accurate as well as a pleasure. The nomenclature in general follows Gray's "Manual." Local ranges are cited, frequently with bibliographical references. Meanings or derivations of generic and specific names are given, together with common names. One learns that Bermuda grass isn't native to Bermuda and that its scientific name means "dog tooth with fingers;" that Kentucky blue-grass is not particularly Kentuckian and that it was not named *Poa pratensis* after Edgar Allen Poe, but is Greek-Latin hybrid for meadow grass. *Hemerocallis*, the daylily genus, is Greek for "day beauty," while *Ornithogalum* is a whimsical Greek name, meaning bird-milk, alluding to the whiteness of the flowers. Colicroot (*Aletris*) is Greek for "a female slave who grinds corn" (grain). Many of the scientific names are just Greek or Latin names for "some plant," no one knows which, but of which botanists have made modern use "just because."

The authors expect to publish, in the next two or three years, the remaining parts, together with an index, making the flora of the State's two thousand vascular plants complete.

ORLAND E. WHITE
Blandy Experimental Farm
Charlottesville, Va.

SYSTEMATICS OF FLOWERING PLANTS. Patricia Mann. 307 pages, illustrated, indexed. Pitman Publishing Co., New York. (Printed in Great Britain.) 1952. $4.50.

We are faced with an ever-increasing need for a simplified textbook on the college level, designed to meet the requirements of the student entering the field of the taxonomy of the flowering plants. Miss Mann's book, while hardly more than pocket-size, is filled with a wealth of condensed factual data. Her precise style is equally appealing to the interested amateur. Approximately two-thirds of the text is centered around twelve selected families of Angiosperms, including e.g., Liliaceae, Leguminosae, and Compositae. Species well known to British botanists and, fortunately, to the majority of Americans serve to typify these families. One hundred and eighty-two figures, beautifully executed, show clearly the principal morphological characters of the groups.

Miss Mann has not failed to recognize the importance of genetics in taxonomy. Perhaps she has over-emphasized this phase, as well as, e.g., the importance of methods of pollination in the selected families, in the sense that she has almost completely excluded discussions of the rules of nomenclature and of the problems of plant distribution. This, however, is a matter of opinion. Your reviewer has used this book in a one-semester course in systematic botany and has found it to be an excellent guide when fortified by considerable collateral reading.

JOHN D. DWYER
Assoc. Prof. of Biology
Siena College

PHILIPPINE ORCHIDS. Reg S. Davis and Mona Lisa Steiner. 270 pages, illustrated, indexed. William-Frederick Press, New York. 1952. $5.

ENUMERATION OF PHILIPPINE APOSTASIACEAE AND ORCHIDACEAE resulting from the comprehensive study by Professor Oakes Ames of Harvard University, with the cooperation of Dr. E. D. Merrill, will long remain the authoritative reference on the orchid flora of the Philippine Islands. However, there has been a call for a semi-popular book on these plants which would satisfy the requirements of amateur orchid enthusiasts. PHILIPPINE ORCHIDS would appear to fill this need very well.

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The book treats of one hundred native species giving descriptions, historical and geographical information, and cultural hints. The book is well written and profusely illustrated with black and white photographs. There are also several line drawings by Luisa S. Cruz of Manila.

SUCCESSFUL FLOWER MARKETING. Violet Stevenson. 164 pages, illustrated, indexed. Transatlantic Arts, Hollywood-by-the-Sea, Florida. (Printed in Great Britain.) 1952. $3.75.

The jacket shows the photograph of a most attractive woman, looking at you with a pensive smile and twinkling eyes. But do not be misled by the caption: "Violet Stevenson won her first prize for flower arrangement at the age of ten," for though the author has the soul of a poet, the eye of an artist, she also has the hard-headed business sense of a good executive. She knows the ultimate consumer, the retailer, the wholesaler, and the grower, is thoroughly familiar with the problems, the wants, and the desires of each of them.

I believe that one of the basic causes of the problems facing the flower industry in this country today is the lack of a market survey of public taste. Styles and tastes are constantly changing, but the industry persists in adhering to many out-dated, so-called standards and continues to offer them to the public on a "take-it-or-leave-it" basis.

The pages of this book are brimful with ideas to make more people buy more flowers more often. It advocates honest grading, neat bunching, attractive packaging, careful handling, cooperation between grower and wholesaler, and numerous other ways of marketing flowers successfully. It's a marvel of the most minute detail, that only a life devoted to floriculture could produce. It's a *MUST* for anyone interested in the subject.

To you, Violet Stevenson, my warmest congratulations on a good job, well done.

ADRIAN FRYLINK
Babylon, L. I.

WEED CONTROL. Wilfred W. Robbins, Alden S. Crafts and Richard N. Raynor. 503 pages, illustrated, indexed. McGraw-Hill, New York. 2nd Edition, 1952. $8.

Since the appearance of the first edition of this book, the development of weed control, particularly as concerns new herbicides and their widespread use, has progressed rapidly. Subsequent to the discovery of 2-4 dichlorphenoxyacetic acid and other hormone-like chemicals for use as herbicides, no book on weed control has enjoyed the experience of remaining up-to-date for very long. It is, therefore, with pleasure that we note the appearance of this much-welcomed revised edition in which the authors bring the readers the recent advances that have been made by the use of herbicides for controlling weeds.

The book devotes three chapters to the general habits of weeds, their reproduction, and methods by which they may be prevented from being introduced and spread. Chapter four is devoted to the ecology of weeds and chapter five considers the principles of weed control. Tillage methods and biological control are each discussed in a chapter. Chemical weed control, the action of chemicals and their application and function as contact herbicides and selective herbicides are discussed in chapters 8 to 20.

Special weed problems of grasslands, cropped areas, and uncropped areas are treated in chapters 21-23. Special weeds are treated in the final chapter.

An appendix lists common names used in the text by which their scientific names may be ascertained by those unfamiliar with them.

W. C. MUENSCHER
Dept. of Botany
N. Y. State College of Agriculture

DISEASES OF VEGETABLE CROPS. John C. Walker. 529 pages, illustrated, indexed. McGraw-Hill, New York. 1952. $7.50.

This book is precisely what the author intended it to be; namely, an up-to-date compilation of the essential information on the nature and control of the diseases of the important vegetable crops. It is not only a valuable reference book for the graduate student, teacher, and research worker, but is a useful handbook for the extension specialist, county agent, agricultural industrialist, and professional vegetable grower. No extension specialist should be without it.

The book comprises sixteen chapters. Each one deals with a different vegetable or group of closely related vegetable crops. The diseases are listed according to their causal agents, beginning with those of a non-parasitic nature and proceeding through those caused by bacteria, fungi, and viruses. The following vegetables are covered in the book: asparagus, bean and lima bean, beet and chard, carrot and parsnip, celery and parsley, crucifers, cucurbits, lettuce and other greens, onions, pea, pepper and egg plant, potato, rhubarb, spinach, sweet potato and tomato.

The occurrence and importance of each disease is discussed. This is followed by a description of the symptoms and the causal agent. The method of spread, over-wintering, and the environal relationships are considered under the heading of disease cycle. Finally, the control measures are given. Pertinent references to original researches or to those of a comprehensive nature are given for each disease.

The diseases are discussed with a minimum of words and a maximum of facts, and the illustrations are well selected.

W. T. SCHROEDER
Div. of Plant Pathology
N. Y. Agr. Exp. Station

GRASS, OUR GREATEST CROP. Sarah R. Riedman. 128 pages, drawings by Glen Rounds; indexed. Thomas Nelson & Sons, New York. 1952. $3.

Though this book is intended for "ages 10 - 14," older brothers and sisters, and parents, too, will find it pleasant and informative.

Mrs. Riedman, in telling the story of the grass family and its importance to man, packs history—from the days of wandering huntsmen to herdsmen to modern farmers; folk lore; plant lore; plant science; conservation, into its pages, in a clear-cut refreshing style.

The author, assistant professor of biology at Brooklyn College, understands children—she and her husband own and direct a summer farm-camp in northern New York State for city children—and she has the rare gift of being able to impart some of her scientific knowledge to their age level. The pages are decorated with neat line drawings by Glen Rounds, illustrator and author of children's books.

ROCKS, RIVERS, AND THE CHANGING EARTH. Herman and Nina Schneider. 181 pages, illustrations by Edwin Herron; indexed. Wm. R. Scott, New York. 1952. $3.

The mysterious forces at work on the earth are revealed to the child. He is made acquainted with rivers flowing through mountains and valleys, floods and soil erosion, rocks and minerals, the sea, and so on. There are sample experiments which he can carry out to help him understand the forces of nature more readily. The drawings by Edwin Herron add much to this "first book about geology."

SUNSET PATIO BOOK. 174 pages, illustrated. Lane Publishing Co., Menlo Park, Cal. 1952. $2.

Larger than the usual Sunset publication — 174 pages, 250 illustrations — it is one of the most complete books to date on building a patio or "outdoor living room."

While written primarily for the residents of the western states, residents of the eastern and central states will also find useful information in this book, because of its practical approach to the construction and maintenance problems of outdoor living.

GARDENING HANDBOOK

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FLOWER GARDEN GUIDE
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by G. L. WITTROCK,
Assistant Curator of Education
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NEWS, NOTES and COMMENTS

THE ANNUAL MEETING OF THE NEW YORK BOTANICAL GARDEN

Again, with excerpts from the reports presented at the annual meeting of The New York Botanical Garden, held on May 21, 1953, we give you a review of the past year's accomplishments and a forecast of the plans and projects for the coming year. The Editor.

President's Report, excerpts from: For the twelve months just finished, we set another attendance record. More people came to the Garden than in any previous year in our history. We have more members this year than we have ever had before. The circulation of our magazine has continued to increase. In fact, everything about us is bigger and better than it has been in previous years.

Very briefly, I want to tell you of the progress we have made in our facilities. Our roadways and paths have been substantially increased and improved. A new bridge over the Bronx River makes all of the Garden more accessible. Perhaps you have already seen the great improvements going on in our conservatories. Modernized, they will serve their purpose much better than they have ever been able to before. A new overpass at the Waring Avenue entrance has been built to make the Garden more easily accessible. The work of modernizing our Museum Building has gone forward steadily. In many other ways and places there have been improvements. Many of them are behind the scenes so you cannot see them.

During this year we moved our Downtown Office into a much more desirable location. For the first time we have pleasant surroundings for our office staff and an adequate room for our members and guests.

All of us can hardly wait until we are able to open the Snuff Mill, probably in September. The surrounding area will be beautifully landscaped, and there will be generous arrangements for lunches and recreation surrounding it. This has been one of our longest-felt needs—to have an adequate place for meetings and for the serving of food in the Garden.

It is the intention of the Board of Managers to proceed with the construction of the laboratory building. We now have over $600,000 toward our goal of a million dollars. We know that there is a need for scientific research as such, and that we are justified in planning definitely for construction of the building. It goes without saying that none of these things could have been accomplished, nor can any be accomplished in the future, if it were not for the help, interest, and support of our many, many friends. Commissioner Moses and his associates have continuously helped us in every way possible. The city has been generous in providing money for many of the capital improvements. Members have come forward with substantial gifts for the special projects in research, exploration, and the Snuff Mill facilities. Mrs. Harold I. Pratt, Mrs. Hermann G. Place, and other members of the Advisory Council have been tireless in their efforts to help the Garden. . . . Mrs. James C. Brady and Mrs. Charles G. Stradella, Chairman and Vice Chairman of the Volunteer Associates, have brought that organization to a new peak of effectiveness. The Volunteer Associates have done more with more people participating. . . .

For the first eleven months of this fiscal year, the total gifts to the Garden were over $290,000 compared to $70,000 for the same period last year. I cannot list all, but I do feel I should tell you of some of our generous benefactors—William F. Barrett, Mrs. Dana Bartholomew, Howard Bayne, Edwin De T. Bechtel, Lady Gabriel, Clarence Lewis, the late Colonel Robert Montgomery, Mr. and Mrs. David Rockefeller, John Roger, Joseph R. Swan, Mrs. Thomas D. Thacher, Mr. and Mrs. Arthur Anderson, and Oakleigh Thorne. We also received from Samuel Friedenberg a gift of greenhouses and garden material and equipment valued at more than $40,000.

Another expedition to Venezuela, with our Dr. Maguire heading it, was made possible through the generosity of H. R. Kunhardt and the Davella Mills Foundation. Our library has benefited this year by a substantial gift from Mrs. Roy Hunt and the gift of approximately two thousand volumes of rare and valuable books on horticulture and botany from the private library of Clarence Lewis. There is a possibility of our acquiring one of the largest private botanical libraries in the country if we can develop a plan to house it properly.

We have continued to receive support to our research work from the National Foundation for Infantile Paralysis, the American Cancer Society, the American Agricultural Chemical Company, and the Rockefeller Brothers Fund. The Eli Lilly Company and Merck & Co. also continued their industrial memberships.

Despite all of the buildings and all of the magnificent improvements to the grounds, an institution like ours is great only because of the people in it. Our people continue to work tirelessly to make The New York Botanical Garden outstanding. I regret to say that their rewards are too often on the spiritual side and not enough on the material. . . . We must somehow see that they are adequately paid for the wonderful work they are doing. We must provide, too, for increasing our staff. We urgently need to revive curatorships that have lapsed in the last several years, such as those in genetics, fossil botany, and so on. We would like very much to expand our public education work. I am going to leave to Dr. Robbins the task of telling you of the many things the various individuals here do.

The Director's Report, excerpts from: The New York Botanical Garden has two major objectives. . . . It aims to present as large a variety of plants as possible arranged in an attractive and interesting fashion for the general education and recreation of the public. That The New York Botanical Garden is accomplishing this objective is attested by the 1,500,000 visitors (88,000 in 7 days of Easter week last year), by the success of its program of adult education, by the increasing demands on the staff for information on botanical and horticultural matters, by the growing use of the library, and by the greater distribution of the Garden's popular or semi-popular publications.

The New York Botanical Garden has, however, a second objective which is equally important. That is to preserve, disseminate, and extend man's knowledge of plants. To accomplish this purpose it maintains a technical library, herbarium, laboratories and a scientific staff, carries on research, publishes technical books and journals, participates in the activities of various scientific organizations and supervises the work of students for the masters and doctors degree.

Its many obligations strain the finances and personnel of The New York Botanical Garden. We ended the fiscal year of 1951-1952 with a deficit of over $14,000 and our over expenditure for 1952-1953 will substantially exceed this figure.

News Week has recently discussed in an article entitled "No More Museums" some of the difficulties which face institutions like The New York Botanical Garden. The essential nature of plants, their importance for the continued existence of man on this planet insures the permanence of botanical gardens. They will be continued and supported in one way or another because they must be.

Dr. Robbins then summarized the responsibilities and accomplishments of the various departments.

The maintenance and service department—A. C. Pfander, Superintendent of Buildings and Grounds—is responsible for the care of the buildings and grounds and the supervision of the public which visits the Garden. Carpenters spent 401 days and painters 381 days in the Museum Building; painters spent 259½ days in Range 1, 197 days in Propagating Range, and 255 days on museum cases and exhibits. Other labor spent 596 days cutting grass, 767 days in the arboretum, 570 days removing leaves and paper from the park, 500 days removing trees, 305 days spraying. It is also interesting to note that 1,075 loads of manure, soil and compost, 434¼ loads of discard to city dumps, 499 loads for horticultural work, and 466 loads for flower shows were trucked by garden labor—and yet with all this work done, there were many jobs undone because of lack of labor to meet all the demands of maintenance and service.

The gardening department, which consisted of thirty-six employees including foremen and supervisors under Louis Politi, Head Gardener, set out 49,917 plants in the flower gardens, rock garden and nursery; propagated and set out in nurseries 22,510 woody plants; grew 80,635 plants at propagating range; distributed 10,817 plants and cuttings, and 6,189 packets of seeds. All this in addition to maintaining and, in some instances, replanting chrysanthemum borders, tulip and iris plantings, annual and perennial borders, the rose, herb and rock gardens; and in moving (to make way for reconstruction) and in attempting to preserve the plant collections usually accommodated in the Conservatory.

The Horticulturist, T. H. Everett, devoted his time mainly to supervision of special displays in the Conservatory, in the Museum, and at the International Flower Show; to acting as consultant to groups or individuals; to lecturing and judging. For three months Mr. Everett collected in Great Britain and Ireland 922 plants and 48 cuttings, representing 282 species and varieties, as well as 49 kinds of seeds—the 1952 project of the Founder's Fund of the Garden Club of America awarded to The New York Botanical Garden. He supervised the distribution of this notable

collection to thirteen other institutions; additional plant distributions will be made as stocks become available.

The demands on the library has continued to tax the resourcefulness and energy of the librarian, Miss Elizabeth Hall, and her staff. In addition to rendering service by phone and letter and personally to those who visit the library, book and print exhibits have been dispatched to the Garden Club of America and have been arranged in connection with special events at the Garden.

Among the more notable gifts received during the past year were the 17th, 18th and 19th century books presented jointly by Mrs. Rodney Procter and Mrs. Ernest G. Vietor; the mycological library from the estate of Dr. Gertrude S. Burlingham; the final volume of "Tobacco; its History Illustrated by the Books, Manuscripts, and Engravings in the Library of George Arents, Jr.," by George Arents, Jr.; a collection of some three hundred reprints and catalogs from Stuart P. Miller; the forestry books and separates of the late Marvin H. Greenberger, from his brother, Robert Greenberger; and a valuable group of French botanical and horticultural titles presented by the French Embassy.

Dr. H. W. Rickett, Bibliographer, devoted a large part of his time to duties related to the printing of THE NEW BRITTON AND BROWN ILLUSTRATED FLORA OF THE NORTHEASTERN UNITED STATES AND ADJACENT CANADA. He edited Volume 7, No. 5 of Brittonia and also No. 1 of Vol. 8 of the Memoirs of The New York Botanical Garden, and collaborated with members of the editorial committee on the production of the International Code of Botanical Nomenclature published November 1952. As a member of the Special Committee for Pteridophyta and Phanerogamae appointed by the International Botanical Congress at Stockholm, he spent considerable time in preparing recommendations for *nomina conservanda*.

Dr. P. P. Pirone, Plant Pathologist, devoted a considerable portion of his time in maintaining the health of the Garden's living plant collection. Nearly 47,000 gallons of spray were used in 1952. He assisted in courses for employees of the Park Department, which he serves as a consultant, and conducted a detailed survey of the trees in Leif Erickson Park, Brooklyn, in cooperation with the Arboriculturist of the Department of Parks.

Dr. Pirone continued his investigation on crown rot of delphinium and conducted a series of tests on foliar feeding of *Philodendron cordatum* and *Dracaena Sanderiana*. Those plants receiving five applications of foliage sprays containing a completely balanced nutrient solution were markedly superior in vigor, size of leaves and color than the controls which received the usual nutrients through the soil.

Dr. Pirone found the fungus responsible for the highly destructive wilt disease of *Albizzia julibrissin* in New York City soils, the northernmost point in the U.S. in which this fungus is now known to exist naturally.

It is difficult to present a "balanced diet" of botanical and horticultural subjects in a form suitable for the non-technical reader; that this is being accomplished in The Garden Journal is evidenced by the favorable comments received from its subscribers. Eighty-five book reviews and news items on the activities of The New York Botanical Garden, as well as authoritative and yet popular feature articles were published.

In addition to her duties as editor of The Garden Journal, Mrs. Dorothy E. Hansell arranged the program for the annual Rose Growers' Day, acted as liaison for the Garden and the National Chrysanthemum Society in arranging the three-day Chrysanthemum Show at the Garden and served on the Exhibition Committee as publicity chairman. Mrs. Hansell has handled also publicity on our educational program, Saturday afternoon lecture programs, museum exhibits, and special outdoor displays. She is responsible for the relations with the Garden Club Affiliates and arranged for twenty-eight lectures given by staff members during 1952.

G. L. Wittrock is responsible for the work in adult education. Seventeen courses were given—attended by 567 people; and 8,147 attended the Saturday afternoon lectures. Mr. Wittrock also lectured before garden clubs and appeared on radio and television programs and assisted in the exhibits prepared by Mrs. Charles Burlingham and her committee.

A greater number of pictures in color was made by the official photographer, E. N. Mitchell, of the different shows at the Garden, of the exhibit at the International Flower Show, and of the museum exhibits. Photographs were taken for the records, for use in The Garden Journal, and for publicity purposes.

All the members of the staff of the herbarium, of which Dr. David D. Keck is head curator, contributed to some phase or phases of instructional work of the Garden during the past year.

During the year 1952 there were seven candidates for advanced degrees working in the Herbarium as graduate students from Columbia University. Richard Cowan and John Wurdack completed the requirements for the degree Doctor of Philosophy in June. Dr. Cowan also received a National Science Foundation Fellowship.

In addition, Mrs. Ossadcha-Janata, who held a fellowship from the Research Program of the Ford Foundation on the U.S.S.R. worked on plants used in folk medicine in the Ukraine. Dr. Gregor Shiriaev continued to study the *Astragalus* and related genera of southwestern Asia; Dr. Caroline Allen pursued her studies on the Lauraceae in cooperation with Mrs. Kopp; Brother Alain of Havana, Cuba, was again in residence continuing on the work on the flora of Cuba; Arthur Holmgren of the Utah Agricultural College spent the summer working in collaboration with Dr. Maguire on the projected flora of the Great Basin.

An important addition to the resources of the Herbarium was the collection of Dr. Gertrude S. Burlingham of Newfane, Vermont, which included nearly ten thousand specimens chiefly of the genera *Russula* and *Lactarius*. In addition, Dr. Samuel C. Damon of Philadelphia left his collection of Hypomycetes to the Garden.

Progress has been made on the study of the Ecuadorian collection of Dr. W. H. Camp, on the British Guiana and Venezuelan collections, and on the projected flora of the Great Basin region. A beginning on the manuscript for the flora of the Pacific Northwest has been made by Dr. Arthur Cronquist; for the flora of California by Dr. David D. Keck, and for the illustrated flora of the Pacific States by Dr. Cronquist and Dr. Keck. THE NEW BRITTON AND BROWN ILLUSTRATED FLORA OF THE NORTHEASTERN UNITED STATES AND ADJACENT CANADA by Dr. H. A. Gleason was completed.

Frank C. MacKeever acted as Custodian of the Herbarium which now contains 2,313,234 specimens. Over 16,000 specimens were sent on loans to eighty different institutions or specialists in all parts of the world; 211 separate loans were made.

E. J. Alexander, Associate Curator, continued his researches on the Cactaceae and Crassulaceae, on the plants of Mexico, on those of the southern United States, and on cultivated plants. He identified twenty-five hundred specimens for the general public and horticulture department and twelve botanical collections, and assisted in the distribution of plants in the Herbarium.

Charles B. Harding presents Distinguished Service Awards to Robert Moses, right, and Dr. H. A. Gleason, left

Here are some of the guests at the head table at the Advisory Council luncheon given in honor of Mrs. Harold I. Pratt: left to right, Mrs. Arthur Hays Sulzberger, Charles B. Harding, Mrs. Pratt, Robert Moses, Mrs. Hermann G. Place, Rev. Father Laurence J. McGinley, S.J., Mrs. Elon Huntington Hooker, and Dr. William J. Robbins

Joseph Monachino continued his studies on the Apocynaceae, Asclepiadaceae, and Sapotaceae, and completed a revision of the South American species of *Manilkara*. He continued his interest in the genus *Strophanthus* and has cooperated in introducing for experimental cultivation in the New World about twenty species of this genus.

Dr. Bassett Maguire and Dr. John Wurdack have been occupied with botanical exploration and collecting in northern South America.

Dr. Rogers, in addition to his curatorial duties, has served as secretary for the Special Committee for Fungi named at the International Botanical Congress at Stockholm.

Dr. Robbins, Dr. Marjorie Anchel, Dr. Annette Hervey and assistants continued antibacterial investigations and reported progress on the isolation and characterization of antibiotic substances produced by Basidiomycetes.

Up to the present, sixteen antibiotic compounds from the Basidiomycetes have been isolated in our laboratories and partially or completely characterized. Of the sixteen, seven have been identified as polyacetylenes, three are quinones or quinoids in structure, and three are thought to be sesquitepenes.

Investigations on the antianemia vitamin (vitamin B_{12}) and on *Euglena gracilis* were continued by Dr. Robbins, Dr. Hervey, and Mary Stebbins. The variability of Euglena under the influence of streptomycin, aureomycin, and elevated temperature was studied. Some seventy isolations of strains of *Euglena*, which varied in color or other characteristics, were all found to require vitamin B_{12}. Measurable amounts of vitamin B_{12} were found to develop in distilled water. The specificity of vitamin B_{12} and related compounds for *Euglena* was investigated.

Investigations by Dr. Igor Asheshov, Frieda Strelitz, Elizabeth Hall, and assistants on substances active against the bacterial viruses demonstrated that inhibitors of bacterial viruses are not uncommon products of the filamentous fungi and actinomycetes. Of some 1770 isolations of fungi and actinomycetes investigated, about one hundred fifty were found to produce substances which inhibited the development of one or more bacterial viruses. The substances are more or less specific; some act on a few viruses, others have a wide spectrum of action. Evidence continues to accumulate that phagopedin sigma, first isolated in our laboratories and produced commercially under the name fumagillin, is an amebicide of therapeutic importance. One new inhibitor of bacterial viruses, phagolessin A58, has been described and others are being investigated.

Advisory Council — in her report as Chairman, Mrs. Hermann G. Place said, in part: Our membership of ninety-four has a real feeling of personal responsibility towards the Garden, and our new members will bring increased interest in its development.

We had planned to use $500.00, set aside this year for a special planting, to plant the bank of the Bronx River but a generous donor made this unnecessary.

Mrs. John Parsons and her committee have continued planting two more sections of the perennial border. Mrs. Guthrie Shaw and her committee are serving in an advisory capacity in the planting of the bank of the Bronx River opposite the Snuff Mill.

The culmination of our year was the luncheon on May 5 in honor of Mrs. Harold I. Pratt in recognition of her work for the Garden over many years and, in particular, in recognition of her generous gift which made possible the renovation of the Snuff Mill.

Mrs. Place announced with regret the death of the corresponding secretary of the Advisory Council, Mrs. Richard Fenby Bausman.

Volunteer Associates — Mrs. James Cox Brady, in presenting her report as Chairman, said in part: The Volunteer Associates has three functions, one is to raise money; another is service to Garden members through lectures, tours, Members' Days, Open House, etc.; and the third is its public relations program such as special displays, lunches to interest new members, and serving as hostesses at the children's chrysanthemum show.

During the past fiscal year, the Volunteer Associates received contributions in excess of $1,500 for the decoration of the Downtown Members' Room and $5,000 for displays and renovation of the exhibition wing of the Museum Building. It realized $10,800 from the Theater Benefit, arranged by Mrs. Richard S. Meredith and Mrs. Charles Stradella.

The Volunteer Associates ran a series of Downtown Lectures, arranged by Mrs. Clarance Stanley and Mrs. Oakley Sheldon; conducted the annual spring garden tour under the leadership of Mrs. Percy Douglas and Mrs. Henry Roberts; and served as hostesses, under the chairmanship of Mrs. Charles Doscher and Mrs. Stradella, to the children's competition at the Chrysanthemum Show.

Under the chairmanship of Mrs. Charles Burlingham, the display committee exhibited a collection of Rutherford Platt photographs in October; decorated six windows with plant material as the Christmas exhibit; and arranged the exhibition "Cotton From Fable to Fashion." The Volunteer Associates gave a luncheon on May 11, the opening day of the Cotton Exhibition, when they entertained guests whom they are trying to interest in the Garden; and that afternoon served as hostesses to sixty representatives from leading cotton concerns.

"Open House" on the second day of the month was initiated this year and will be resumed in the fall.

Distinguished Service Awards. The New York Botanical Garden presented its Distinguished Service Awards to Robert Moses, Commissioner of Parks of the City of New York, for his notable public service in effecting improvements in the city's parks and highways and in The New York Botanical Garden in particular.

In acknowledging the award, Mr. Moses said, in part: It is a flattering distinction to be recognized in this way by discriminating and generous trustees of a great foundation.

The City, which is in a sense your host and in an even more important respect your partner, is happy in this relationship. More and more the Garden is indispensable, as population grows up around it. Visitors increase. Acreage shrinks. The city-operated part of Bronx Park is one thing. It is for ordinary public recreation. The Zoo is another. It is for restricted amusement, instruction, and science. The Botanical Garden is a third. It is fenced and stands for beauty and research. Combined and added to Fordham University, Van Cortlandt and Pelham Bay Parks and the parkways which connect them, these priceless heritages form a belt of green oases in what would otherwise be an endless waste of brick and mortar.

May this Garden, established by the piety of good citizens and patiently tended by them, burst into bloom with each succeeding week, proudly wear the garments of the following seasons, and continue to unveil in its laboratories the secrets of life and sunlight.

The Distinguished Service Award was also presented to Dr. Henry A. Gleason, Curator Emeritus of The New York Botanical Garden, in recognition of the great distinction he has attained in his chosen field of taxonomy; his South American explorations and studies which have developed into a continuing research program of The New York Botanical Garden in that vast region; and his achievement in writing THE NEW BRITTON AND BROWN ILLUSTRATED FLORA OF THE NORTHEASTERN UNITED STATES AND ADJACENT CANADA.

Honoring Mrs. Harold I. Pratt. The Advisory Council of The New York Botanical Garden honored Mrs. Harold I. Pratt at luncheon in the Members' Room of the Museum Building on May 5. It was a very happy occasion, and Mrs. Pratt charmed everyone with her delightful remarks on the history and activities of the Advisory Council and the pleasure she has derived from her contributions to the beautification and expansion programs of The New York Botanical Garden, especially the azalea plantings and the renovation of the old Lorillard Snuff Mill to a restaurant.

Robert Moses, Commissioner of Parks of the City of New York, commended the Advisory Council for its interest in the conversion of the Snuff Mill into a restaurant and meeting place, and referred to the improvement of roads and bridges in the Botanical Garden and to the reconstruction of the Conservatory. Mr. Moses also stated that the city was interested in the proposed new laboratory. Charles B. Harding, President of The New York Botanical Garden, mentioned the planting to be done on the bank of the Bronx River near the Snuff Mill—and also stated that announcement would be made at the annual meeting of The New York Botanical Garden on May 21, that the Board of Managers had authorized the architects to draw up final plans so that work can be started on the new laboratory before the end of the year. Dr. William J. Robbins, Director, spoke of the necessity for expanding the facilities of The New York Botanical Garden for scientific research and for the dissemination of information on plants. He also referred to the desirability of looking forward to more adequate facilities for the library. A very fine collection, numbering two thousand volumes, had recently been presented to the library by Clarence McK. Lewis, member of the Board of Managers.

Mrs. Hermann G. Place, Chairman of the Advisory Council, graciously introduced the above speakers, Rev. Fr. Laurence J. McGinley, S.J., President of Fordham University, who gave the blessing, and the other guests at the head table: Henry F. du Pont, member of the Board of Managers, Mrs. De Witt Wallace, publisher of Readers' Digest, Joseph Swan, Chairman of the Board of Managers, Mrs. Arthur Hays Sulzberger, Chairman of Board of Directors of New York City Park Association, and, as Mrs. Place said, "the name of Sulzberger always mean "The New York Times": Mrs. Elon Huntington Hooker and Mrs. Thomas D. Thacher, both past chairmen of the Advisory Council; Mrs. James Cox Brady, Chairman of Volunteer Associates; and Richard Tobin, representing the New York Herald Tribune.

Mrs. Place also thanked various members of the Advisory Council for their participation in the day's program: Mrs. John D. Beals, Jr., and Mrs. Charles Proffitt, co-chairmen of the lunch; Mrs. Warren Kinney for the beautiful table decorations; Mrs. James C. Mackenzie, Mrs. Ethelbert Ida Low, and Mrs. Thomas D. Thacher on seating arrangements; Mrs. Charles Burlingham, Mrs. Richard S. Meredith, and Mrs. Donald B. Straus, and Mrs. Schmederer for the splendid Cotton Exhibition; Mrs. John E. Parsons and Mrs. Guthrie Shaw, who are working with T. H. Everett, Horticulturist, and Louis Politi, Head Gardener, on plantings, particularly the perennial border.

COTTON FROM FABLE TO FASHION

FORMAL OPENING OF
COOPERATIVE EXHIBITION AT
THE NEW YORK BOTANICAL GARDEN

The extensive exhibition, "Cotton From Fable to Fashion," opened May 11 in the Museum Building of The New York Botanical Garden and will continue until the middle of November. The exhibition is divided into sections stressing special aspects—botanical, historical, spinning, weaving, growing, and modern manufacturing methods.

W. Ray Bell, President of the Cotton Textile Merchants, cut the cotton rope at three-thirty o'clock, officially opening the exhibition. Mr. Bell said it was fitting that the series of economic botany exhibitions at The New York Botanical Garden should start off with cotton, for cotton has been closely linked with the history and development of our nation. Mr. Charles B. Harding, President of The New York Botanical Garden, and Dr. William J. Robbins, Director, welcomed the visitors.

The brief ceremonies were witnessed by representatives of leading cotton interests of the country including: Sallo M. Kahn, Vice-President, William L. Barrell Co.; J. W. Barnett, Vice-President, Cannon Mills; J. T. Quisenberry, Vice-President, The Catlin Farish Co.; W. H. Dribben, Vice-President, Cone Mills, Inc.; Oswald B. Lord, Vice-President, Galey & Lord; James E. Robison, President, Indian Head Mills; John S. Thompson, Vice-President, Julliard Co.; John Bowen, President, Minot Hopper Co.; C. Stuart Robertson, President, Robertson Factories; Ridley Watts, Vice-President, Spartan Mills; W. E. Clark, Vice-President, U. S. Rubber Co.

Also, representatives of National Cotton Council, American Cotton Manufacturer's Institute, Arundell Clarke, California Hand Prints, Callaway Mills, Dan River Mills, Fuller Fabrics, Greenwood Mills, Lockport Cotton Batting Co., Pacific Mills, Peter Pan Fabrics, Reeves Brothers, Russell Manufacturing Co., J. P. Stevens Co., Turner Halsey Co., Warner Woven Label Co., and Wheary, Inc.

Cooperating with The New York Botanical Garden in "Cotton from Fable to Fashion" are: Arts Cooperative, Arundell Clarke, Lucinda Ballard, Bergdorf Goodman Co., Berkshire Fine Spinning, Inc., Ciba Co., Inc., Cone Mills, Inc., Mrs. Morris Crawford, Dobeckum Co., Fulle. Fabrics Corp., Galey & Lord, Inc., Mrs. Alan Grant, Kennedy & Co., Elinor Merrell, Herbert Meyer, Inc., National Cotton Council, Spool Cotton Co., Teachers College; and American Museum of Natural History, Dr. Junius Bird, Associate Curator of Archaeology; Brooklyn Museum, Mrs. Michelle Murphy, Research Consultant; Cooper Union, Miss Alice Beer, Keeper, and Miss Jean Mailey, Assistant Keeper of Textiles; Marine Museum, Mystic, Conn., Edward Stackpole, Curator; Metropolitan Museum of Art, Dr. M. S. Dimand, Curator of the Near East; Museum of the City of New York, Miss Isabelle Miller, Curator; Scalamandré Museum of Textiles, John Tilton, Director.

Advisory Council. Mrs. LeRoy Clark and Mrs. Inglis Frost have been elected to membership on the Advisory Council of The New York Botanical Garden.

Memorandum on Collaborative Exploration of Venezuela. Dr. Bassett Maguire, who returned from Venezuela on May 19, brought with him a proposal for the collaborative botanical exploration of Venezuela between the Botanical Service of the Ministry of Agriculture and Forestry of Venezuela and The New York Botanical Garden.

The purpose of such an undertaking would be to make known the vegetative cover of each zone as to the classification of the plant formation and their relationship to soil and climate. In this exploration, there will be the collection of plants which will form the basis for a flora of Venezuela.

The plant collections and the scientific data which will result from such a program

Mrs. Charles Burlingham, Mrs. James Cox Brady, Dr. William J. Robbins and Charles B. Harding stand with W. Ray Bell as he cuts the cotton rope, opening the Cotton Exhibition.

The left wing of the Museum and Administration Building in which the exhibition, "Cotton From Fable to Fashion" is being held

of exploration will accrue to the Botanical Institute of Venezuela and The New York Botanical Garden.

The details of the proposed contract are presently being studied by a committee of the Board of Managers of The New York Botanical Garden.

Dr. Lanjouw Visits U. S. Botanical Gardens. Professor J. Lanjouw, Director of the Botanical Museum of the University of Utrecht, the Netherlands, and Secretary of the recently organized International Association of Plant Taxonomists, visited several botanical gardens in the United States. He spent a day in April and two days in May at The New York Botanical Garden, consulting with members of the staff on questions that will come before the Eighth International Congress, Paris 1954. A small session of botanists of the New York area met with him to discuss questions of nomenclature and the program of the International Bureau of Plant Taxonomy and Nomenclature.

D. Lanjouw lectured on "The Vegetation of the Surinam" at the University of California, Pomona College, Harvard University, and elsewhere. Upon completion of his North American trip, arranged under the auspices of the Rockefeller Foundation and the International Union of Biological Sciences, Dr. Lanjouw will spend two months in the Dutch West Indies and Surinam.

Prof. Helyar Retires. Field Day, May 2, 1953, at the College of Agriculture, Rutgers University, turned into a tribute to Professor Frank G. Helyar, Director of resident instruction, who will soon retire, after thirty-six years of service. Highlights in his career were dramatized in floats that made a colorful cavalcade.

Dr. Lewis Webster Jones, President of Rutgers, praised Professor Helyar for his human qualities and his high standards for agricultural education. Dr. William H. Martin, Dean of the college, said that faculty and students alike will miss him. George W. Luke, assistant professor of agricultural economics, presented Dr. Helyar, on behalf of former students who had lived in Phelps House, with a wallet containing eight one-hundred dollar bonds.

Westervelt Griffin, assistant to the director of resident instruction, has been appointed assistant dean of the College of Agriculture, succeeding Professor Helyar. Dr. Ordway Starnes, extension specialist in entomology, has been named assistant director of the New Jersey Agricultural Experiment Station, effective September 1; and Van Wie Ingham, assistant to the dean and director, was made executive secretary of the College of Agriculture and Experiment Station, effective July 1. According to Dr. Lewis Webster Jones, President of Rutgers University, these appointments represent an administrative reorganization at the College of Agriculture and Experiment Station as recommended by Dr. W. H. Martin, Dean and Director of these institutions.

Tribute to Clarence Lewis. Several months ago "Skylands Farm," the beautiful estate of Clarence Lewis at Sterlington, N. Y., was sold to become the new site of Shelton College, now located in midtown New York City.

To mark the transfer of ownership and to pay tribute to Mr. Lewis for his great contributions to horticulture, some of his garden friends visited "Skylands Farm" on Saturday afternoon, May 30, and later that day tendered him a dinner at the Swiss Chalet in Ramsey, N. J. The group included members of the staff of The New York Botanical Garden — Mr. Lewis has been a member of the Board of Managers since January, 1930, those who had served as head gardeners or on the garden staff of "Skylands Farm," and other garden enthusiasts appreciative of its remarkable plant collections.

T. H. Everett, Horticulturist of The New York Botanical Garden, was an inimitable master of ceremonies at the dinner and called for a few remarks from Dorothy Ebel Hansell, Editor of The Garden Journal of The New York Botanical Garden; Alex Campbell, head gardener of Smith College; Harry Kendall, long associated with Mr. Lewis as his farm superintendent; Dr. Ben Blackburn; Miss Elizabeth C. Hall, Librarian of The New York Botanical Garden; and Harold Epstein, President of the American Rock Garden Society. Mr. Lewis, in concluding his words of appreciation for the occasion, read Rudyard Kipling's "The Glory of the Garden."

Dr. J. Oliver Buswell, Jr., President; H. E. Hammer, Business Manager, and Mrs. Walter R. Ecklemann, Head of the Biology Department, spoke feelingly of the beautiful environs in which their liberal arts college is to be located. Dr. Buswell expressed the hope that those present — or at least some of them — would constitute themselves an advisory committee to help Shelton College preserve "Skylands" as an example of American culture.

A view of the Cotton Exhibition, showing the cotton plant in the foreground

The gray stone dormitory at the School of Horticulture, Ambler, Pa., with steps leading down to the rock wall. There is a succession of bloom from early spring to fall in the perennial borders on each side.

1953 Spring Garden Tour. The weather was not favorably disposed, when the party left by bus from the Pennsylvania Station before nine o'clock on the morning of May 7—and it rained torrentially while visitors strolled around the grounds of the School of Horticulture at Ambler. However, the rains ceased to fall in the afternoon, permitting a more comfortable visit to the three other gardens in the 1953 Spring Garden Tour of The New York Botanical Garden.

After walking through the entrance hall of the dormitory at Ambler, the visitors came out on a terrace overlooking herbaceous borders, separated by a broad grass panel and reminiscent of English gardens. Four sheared specimens of the Japanese yew (*Taxus cuspidata*) serve as accents in the borders.

T. H. Everett, Horticulturist of The New York Botanical Garden, pointed out, among other interesting specimens: sweet bay, *Magnolia virginiana*, which is native to moist, acid soil areas from Massachusetts to Florida; Asiatic sweet leaf, *Symplocos paniculata*, whose clusters of fragrant small white flowers are followed by very bright blue berries; *Photinia villosa*, another shrub whose small white flowers are followed by striking berries, brilliant red, in this case. The foliage of the last colors handsomely in autumn.

Included in the border planting against the new library building is *Cotoneaster salicifolia*, a Chinese evergreen or partially evergreen shrub. The evergreen barberry, *Berberis Chenaultii*, is a choice plant, too. On the hill in front of the library building a group of *Syringa persica laciniata* has been planted against the greyish-leaved *Cotoneaster Zabelii*.

The School of Horticulture comprises about one hundred thirty acres of gently rolling fields, pasture lands, and woodlands in which are naturalized many native wild flowers. The rose garden, with its box-bordered paths and latticed arbor, is located near the farm house which was built in 1769. There is a fine pre-revolutionary stone barn with hand-hewn beams and a picturesque walled farmyard.

"Pheasant Run," the home of Mr. and Mrs. Robert McLean at Fort Washington, was built twenty-five years ago—the barn, stable and pigeon tower of local stone around a courtyard in the French manner. The great charm of this place is the natural contour of the land and the sympathetic skill with which buildings and plantings have been wedded to it. Restraint in planting is, to a great extent, responsible for the spacious beauty of "Pheasant Run." There is a beautiful view from the terrace, an outdoor living room with pots of blooming plants changing with the season; and the woodland back-drop of dogwood surrounds almost the entire property. One of the interesting features is a "ha-ha," an old-fashioned but extremely effective landscape treatment. This is a sunken fence designed to keep sheep and other stock from encroaching on an area, without obstructing the view of those occupying the area. The "ha-ha" consists of a broad trench, one side of which is bounded by a vertical wall, the other consisting of sloping pasture. The name "ha-ha" is supposed to come from the exclamation that might arise upon coming upon such a feature unexpectedly.

At the approach to the residence of Mr. and Mrs. Nicholas Roosevelt in Ambler stands a large white oak. The plaque on this venerable tree bears the inscription: "This tree was living when William Penn came to Pennsylvania 1682. White Oak, *Quercus alba*. Girth breast high 1932 fifteen feet eight inches."

"The Highlands" is a very dignified house built in the Georgian style by Anthony Norris in 1796 on an eminence overlooking White Marsh Valley. According to an old document, the site was chosen because of the magnificent "park tree"—the white oak previously mentioned. From the steps leading down into the garden, one can see a row of Japan cedar, *Cryptomeria japonica*, in the distance. In Japan, this tree is extensively planted in temple gardens and to form ceremonial avenues.

Old stone walls and superb specimens of boxwood add greatly to the charm of the spacious grounds. The wall on one side of the boxwood garden—the planting of the garden was begun in 1926—was part of an orangery. The attention of the visitors was drawn to the trifoliate orange, *Poncirus trifoliata*, a fragrant-flowered species from China. Its small, slightly fuzzy oranges are decorative but inedible. The visitors were also interested in a large white mulberry tree, *Morus alba*, which has been used in the Orient for twenty-five hundred years as food for silk worms.

Two large Chinese holly, *Ilex cornuta*, mark the main entrance to "Ropsley," the gardens of Mr. and Mrs. Edgar Allan Poe in Philadelphia. The residence combines characteristics of English, French, and Italian architecture and these characteristics have been considered in the landscaping of the grounds. The paved court, in which there are magnificent box specimens, is French; this blends into the Italian entresol, the stairway lined with potted plants. The large tiled hall opens onto a formal French garden on four levels.

Of special interest to those on The New York Botanical Garden garden tour was the allee of pleached lindens, beautiful white-flowered and lavendar-flowered wisterias against the house, and a colorful flower border.

International Orchid Show. National Capitol Orchid Society and American Security and Trust Co., announce the Sixth International Orchid Show to be held in the lobby of the main office of the American Security & Trust Co., 15th St. and Penn. Ave., N.W., Washington, D. C., Oct. 23-25, 1953. Contact the Show Chairman, Linnaeus T. Savage, Asst. Secy., American Security & Trust Co., for information.

Mid-Century Conference on Resources for the Future. Lewis William Douglas, chairman of the Board of Mutual Life Insurance Co. of New York, and former U. S. Ambassador to the United Kingdom, will be the chairman of the Mid-Century Conference on Resources for the Future to be held in Washington, D.C., Dec. 2-4, 1953. Vice Chairmen of the Conference are Herman W. Steinkraus, President of Bridgeport Brass Co., Dr. Lewis Webster Jones, President of Rutgers University, and Dr. Karl T. Compton, Chairman of Corporation of Massachusetts Institute of Technology.

The scope of the Conference will "be broad and will consider land and its products, water, minerals, energy; not only materials but the services that resource base supplies." "The chief aim will be to explore means by which we can act now to meet immediate situations and act in ways that will safeguard our economic position twenty-five or fifty years from now."

Dr. R. G. Gustavson, Chancellor of the University of Nebraska, was recently elected president and Horace M. Albright, president of the U. S. Potash Co. Inc., chairman

Left. **The façade of "The Highlands" — the house was built by Anthony Norris in 1796 — is of pinkish stone; the present owners are Mr. and Mrs. Nicholas G. Roosevelt.**

Right. **The view of the east terrace of "The Highlands" overlooking the plaisence.**

of the board, of Resources for the Future, Inc. Dr. Gustavson will leave the University of Nebraska in July to assume his duties as full-time operating head of Resources for the Future, Inc.

Eleventh Annual Rose Day. Well over three hundred rose growers, amateur and professional, visited the rose garden on the morning of June 11, 1953, the occasion of the Eleventh Annual Rose Day at The New York Botanical Garden. No one could have wished for more perfect weather conditions!

In the afternoon the visitors met in the lecture hall of the Museum Building, where they were greeted by Dr. William J. Robbins, Director. Dr. Robbins turned the afternoon session over to T. H. Everett, Horticulturist, who, as master of ceremonies, introduced the guest speaker, Niels J. Hansen of Washington, D. C. Mr. Hansen, Vice-President of the American Rose Society, talked on "Rose Growing, Yesterday and Today." Ann Hagan, well-known professional flower arranger, gave a demonstration on arranging roses.

A clinic on the culture of roses and how to combat the insects and diseases which trouble them, proved a popular feature of the day's program. Participating in the clinic, under Mr. Everett's guidance, were Paul Frese, Editor of "Popular Gardening"; Miss Hagan; Dr. A. D. Mollin, amateur rosarian of Great Neck, L. I.; Dr. P. P. Pirone, Plant Pathologist of The New York Botanical Garden; Mr. and Mrs. F. F. Rockwell, the former Editor-in-chief of The Home Garden, the latter author and lecturer on flower arrangements; Dorothea Bobbink White, Vice-President of Bobbink & Atkins, and Mrs. Adelaide B. Wilson, author and lecturer on flower arrangements.

Artistic arrangements featuring roses were made by members of garden club affiliates of The New York Botanical Garden: Mrs. Howard Perry, Douglaston Garden Club; Mrs. Frances Digi, Flushing Garden Club; Mrs. Loren Dodson, Larchmont (N. Y.) Garden Club; Mrs. Robert Mallory, Little Garden Club of Rye (N. Y.); Mrs. Robert E. McNeill, Jr., Garden Club of Montclair; Mrs. Edward H. Ladd, III, Plainfield Garden Club; Mrs. Percy S. Howe, Short Hills Garden Club. These were greatly admired, as were the displays of cut blooms representing rose introductions for the past several years, which were furnished by Armstrong Nurseries, Ontario, Calif.; Bobbink & Atkins, Rutherford, N. J.; Conard-Pyle, West Grove, Pa., and Jackson & Perkins, Newark, N. Y.

Miss Elizabeth C. Hall, Librarian, arranged an extensive exhibit of old and new books on roses, including a special display of Redouté, in the Library.

Dorothy E. Hansell, Editor of The Garden Journal, was in charge of the arrangements for Rose Day.

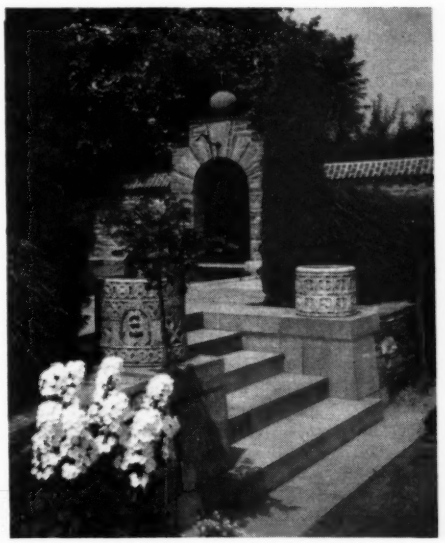
One of the visitors was inspired to write a poem, which he "Dedicated to Rose Day, June 11, 1953, at The New York Botanical Garden":

A June day in the garden of roses
After a night's gentle rain,
Filling the air with their fragrance,
Delighting the eye within range.

Oh what a haven of refuge,
Just beyond the city's loud roar;
Oh what a spot for observance
Of the beauty so close to our door.

There in those tranquil surroundings,
One forgets the world's turmoil and strife,
The grandeur of nature inspiring,
Fills the soul with true meaning of life.

—Harold Sawyer Lanham



Above. **The approach to the swimming pool at "Ropsley," the home of Mr. and Mrs. Edgar Allan Poe in Philadelphia, Pa.**

Right. **The pleached allee of lindens at "Ropsley."**

Graduation Exercises at The New York Botanical Garden. Graduation exercises for students in the Two-Year Courses at The New York Botanical Garden were held on June 18. Certificates in the Practical Gardening Course were presented to Mrs. Adolph Cascardo, Mrs. Peter F. Curran, Mrs. Jean Edison, Mrs. J. M. Juran, Joseph Makowski, Miss Lane Meyer, Mrs. Henry Salomon, Oscar L. Spears, Thomas J. B. Spencer and William P. Lawless, Jr. There was only one student to receive a certificate in the Science Course—Orville M. Steward. George Bunting of The New York Botanical Garden gave a talk on "The Importance of Knowing Your Garden Plants." The arrangements for the evening were made by G. L. Wittrock, Assistant Curator of Education.

Robert H. Montgomery. Col. Robert H. Montgomery died at the age of eighty on May 2, 1953, at his winter home in Palm Beach, Fla. Col. Montgomery had been a member of the Board of Managers of The New York Botanical Garden since January 1935; in 1949, he presented the Garden with a collection of choice conifers from his estate at Cos Cob, Conn. The conifers, numbering approximately two hundred specimens, are landscaped over an eight-acre area.

On May 26, 1949, at the official opening of the Montgomery Conifer Collection, Col. Montgomery said, "Somebody told me if I had the right kind of hobby it would add ten years to my life. An article in the 'Atlantic Monthly' by George P. Brett who then had a notable pinetum at Fairfield, Conn., inspired me to start a conifer collection. Those ten years passed so I started palms as a hobby and that hobby resulted in the founding of the Fairchild Tropical Garden in Coconut Grove, Fla." In his autobiography, FIFTY YEARS OF ACCOUNTANCY, published in 1939, Col. Montgomery wrote: "It is the supreme interest of my life at this writing. . . . I pray that the Garden will be an inspiration to countless numbers who will be led to adopt a hobby which will never let them down."

In recognition of his work as an amateur in assembling a collection of plants of warm regions in the Fairchild Tropical Garden, Col. Montgomery was awarded a gold medal by the Massachusetts Horticultural Society. In 1948, he was "awarded the Thomas Barbour medal for distinguished service in the preservation of that vanishing Eden, South Florida."

Col. Montgomery was regarded as the dean of the accounting profession. He served as advisor to the federal government on many occasions. In 1904, having received his law degree from Dickinson College, he practised law as well as accountancy in New York, and helped to organize the accounting firm of Lybrand, Ross Brothers, and Montgomery.

He was associated with Columbia University from 1912 until 1931; from 1919 until his retirement, he was Professor of Accounting and member of the administrative board.

Lord Aberconway. Lord Aberconway, President of the Royal Horticultural Society, passed away on May 23, 1953, at the age of 74 at his home, Bodnant, Tal-y-Cafn. The garden was one of the show places of North Wales and known to many gardeners of this country who had the pleasure of visiting it. Lord Aberconway was as proud of his skill as a horticulturist as he was that one of his companies, John Brown, Ltd., built the Queen Elizabeth and Queen Mary.

He visited the United States in 1937 for the purpose of viewing the eastern flower shows. He was honorary judge of the International Flower Show, as also the Boston and Philadelphia shows, and was guest speaker at the annual flower show dinner of the Horticultural Society of New York. During his second visit to this country in 1950, the officers and Board of Managers of The New York Botanical Garden gave a dinner in his honor at the Colony Club.

The Corporation of
The New York Botanical Garden

The New York Botanical Garden was incorporated by a special act of the Legislature of the State of New York in 1891. The Act of Incorporation provides, among other things, for a self-perpetuating body of incorporators, who meet annually to elect members of the Board of Managers. They also elect new members of their own body, the present roster of which is given below.

The Advisory Council consists of 12 or more women who are elected by the Board. By custom, they are also elected to the Corporation. Officers are: Mrs. Hermann G. Place, Chairman; Mrs. James C. Mackenzie, First Vice-Chairman; Mrs. Guthrie Shaw, Second Vice-Chairman; Mrs. Barent Lefferts, Recording Secretary; Mrs. Antonie P. Voislawsky, Corresponding Secretary; and Mrs. John E. Parsons, Treasurer.

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from the HERB SHELF

Stories of Queen Elizabeth's coronation remind us of a most exquisite bouquet of violets which reposes on a bedside table in the royal doll house. We have seen its duplicate in the home of its creator, Mrs. Avery Robinson. Each perfect purple blossom was fashioned by hand in a scale so tiny that one must view it with a magnifying glass to see the dozens of flowers in the whole nosegay. Making such realistic arrangements of metal leaves and petals is but one form of Mrs. Robinson's artistic talents.

The tremendously successful firm of Mary Chess perfumes and cosmetics is another of Grace Chess Robinson's works of art. In the New York stores are found some of the lovely life-like flower decorations which also grace her home. When you see the elegance of one of the Mary Chess shops in this country or in Europe, it is hard to believe that it all began with a tiny herb shop on 61st Street in New York City.

The change-over from selling dried herbs and pot-pourri was effected largely because of Mrs. Robinson's genius for blending scents. With rare skill she has been able to duplicate almost any flower odor. The late Alexander Woollcott asked for a toilet water with the scent of green walnuts. After many months of labor, Mrs. Robinson produced the very essence of the aroma of the fresh nut.

In the gardens at her country home in New Lebanon, New York, the artist's eye for design as well as her green thumb are very evident. Wide marble steps lead up to the white garden planted within low brick walls. When we were there, the large-flowered white clematis was in bloom. It was draped over low square-cut yew trees which flanked the steps—a most arresting and attractive sight. The lovely white blooms stood out against the dark evergreens.

Always the perfect hostess, Mrs. Robinson serves special herb accented sandwiches when she entertains the local garden club come to see the herb garden. Her combinations of flavors in the sandwich fillings are original and delectable. They are served with iced tea made half and half with ginger ale. An orange and a lemon are squeezed in this and lemon balm replaces mint for a garnish.

Cucumber and Cress Sandwiches

Chop cucumbers and add cress, lovage, and a bit of borage chopped very fine. Add enough mayonnaise for easy spreading.

Crabmeat Circles

Mix one tin crab meat with one package of Philadelphia cream cheese, which has been softened with cream to make it the consistency of mayonnaise. Add one tablespoon dill and one tablespoon sorrel chopped very fine. Spread on rounds of bread and decorate the edges with chopped dill. Place half a green olive stuffed with pimento in the center.

Gertrude B. Foster

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To reach the Botanical Garden, take the Independent Subway to Bedford Park Boulevard station, use the Bedford Park Boulevard exit and walk east. Or take the Third Avenue Elevated to the 200th Street station; the New York Central to the Botanical Garden station; or the Webster Avenue bus No. 41 to Bedford Park Boulevard.

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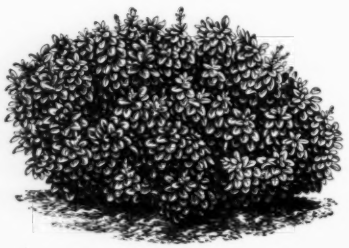

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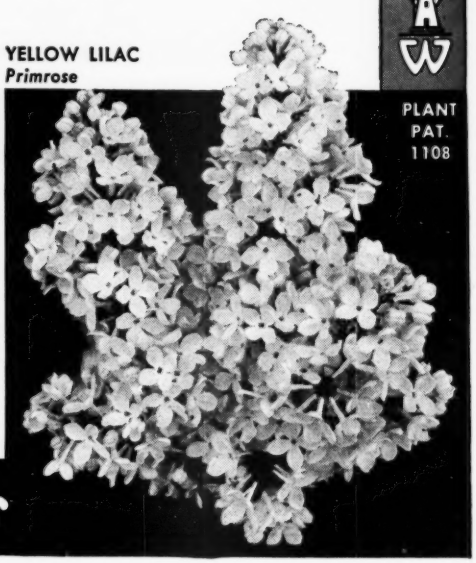
Wayside Gardens

VIBURNUM, *Carlcephalum*
FRAGRANT SNOWBALL

WEATHER PROOF DAFFODIL *"Duke of Windsor"*

BLEEDING HEART, *Bountiful*

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